



Environmental Protection Department
Hazardous Waste Management Division

Area 612 Facility
Contingency Plan

April 1995

Hazardous Waste Management Division

Lawrence Livermore National Laboratory
University of California Livermore, California 94551



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AREA 612 FACILITY CONTINGENCY PLAN

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AREA 612 FACILITY CONTINGENCY PLAN

1. INTRODUCTION

1.1 Purpose

This Contingency Plan was prepared to minimize negative impacts to human health and the environment from fires, explosions, and unplanned sudden or non-sudden releases (due to earthquakes, power outages, or other emergencies) of hazardous, radioactive, or mixed waste constituents to the air, soil, ground water, or surface water from the Area 612 Facility. This Facility is operated by the Hazardous Waste Management Division at Lawrence Livermore National Laboratory (LLNL). This Plan outlines the responsibilities and procedures to be followed in the event of an emergency at this facility and the transportation of waste by HWM personnel between HWM facilities. For example, moving waste from the Area 612 facility to the Building 693 Container Storage Unit. This Plan has been developed in accordance with requirements of 40 CFR 264 Subparts C and D; 22 CCR 66264.50-66264.56; 22CFR 66265.51–66265.56, and the LLNL *Draft Emergency Plan*.

This Contingency Plan is designed to be used in conjunction with the current edition of the LLNL *Draft Emergency Plan*. The *Draft Emergency Plan* is a Laboratory-wide Contingency Plan that includes Implementation Procedures for response to major accidents and disasters, including fires, explosions, hazardous, radioactive, or mixed material or waste releases, and other emergencies that are mitigated by the LLNL Fire Department. Both the *Draft Emergency Plan* and the *Emergency Plan Implementation Procedures* will be collectively referred to as the *Draft Emergency Plan*, throughout this document.

1.2 Scope of the Plan

This Contingency Plan was prepared specifically for the Area 612 Facility. This Plan identifies personnel responsibilities, emergency equipment, and required actions necessary to mitigate accidents within this facility. It is intended to instruct and prepare Hazardous Waste Management Division personnel for potential emergencies.

The Plan specifically defines the types of emergencies that must be mitigated by the LLNL Fire Department and those that may be remedied by Hazardous Waste Management Division personnel. This is accomplished by classifying the particular accident in accordance with the following four incident Levels:

- Level 1 incident (no emergency): A Level 1 incident is a minor problem or incident not involving emergency response units external to the Hazardous Waste Management Division. This type of incident may be characterized by a minor injury requiring first-aid treatment or a minor hazardous, radioactive, mixed waste, or toxic release. The Hazardous Waste Management Area 612 Facility Operations Supervisor acts as the Incident Commander.

- Level 2 incident (minor emergency): A Level 2 incident may be a single fire, a moderate hazardous, radioactive, mixed waste, or toxic release, or an injury requiring medical treatment. The LLNL Fire Department Chief acts as the Incident Commander. The LLNL Emergency Duty Officer is informed.
- Level 3 incident (major emergency): A Level 3 incident includes emergencies such as multiple fires, an explosion, large hazardous, radioactive, mixed waste, or toxic release, or a moderate earthquake. An incident at this level would require site-wide commitment and management of LLNL resources. The LLNL Laboratory Emergency Duty Officer (LEDO) is in charge of the overall incident. The Incident Commander (LLNL Fire Chief) is in charge of the incident scene.
- Level 4 incident (disaster): A Level 4 incident includes emergencies such as a severe earthquake, major fire, major hazardous, radioactive, mixed waste, or toxic release with off-site effects, or an explosion with major damage. These incidents cause extensive injuries, death, property damage, and/or security problems. The Crisis Manager is in charge of the overall incident. The Incident Commander (LLNL Fire Chief) is in charge of the incident scene. The facility-specific Self-Help Plans are activated in a Level 4 incident. These emergency response plans provide additional guidance in response to major emergencies.

Hazardous Waste Management Division personnel may respond to a Level 1 incident without notifying the LLNL Fire Department. This Contingency Plan need not be implemented for Level 1 incident mitigation.

<p>The LLNL Fire Department must be called whenever a Level 2, 3, or 4 incident occurs. Call ext 911.</p>
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1.3 Implementation of the Plan

Provisions of this Contingency Plan are intended to minimize hazards to human health and the environment. This Plan is implemented whenever an incident occurs that requires intervention from the LLNL Fire Department. These incidents are classified as Levels 2 through 4.

Hazardous Waste Management Division personnel must first decide if an incident exceeds a Level 1 classification. Criteria were developed to help them make this determination. A Level 1 incident is exceeded and the Fire Department must be called if any one or more of the following conditions occurs:

- Fire
- Release of materials or wastes with properties unfamiliar to Hazardous Waste Management Division personnel
- Release of materials or wastes that cannot be identified
- Release that cannot be cleaned up or contained and controlled by two individuals in one hour
- Incident resulting in injuries requiring medical treatment
- Incident requiring complete evacuation of a building or the facility
- Any incident regarded by personnel as unsafe to manage in-house
- Released hazardous, radioactive, or mixed material or waste migrating outside the Hazardous Waste Management Facility boundary.

Response procedures for Level 1 incidents are included in this document to provide guidance for Hazardous Waste Management personnel.

1.4 Maintenance of the Plan

A current copy of this Contingency Plan is maintained at the Area 612 Facility, the Hazardous Waste Management Division Office, the LLNL Fire Department, the Health Services Department, and the Safeguards and Security Department; copies are submitted to all appropriate off-site police, fire, and emergency response agencies (see Section 5).

The Plan will be amended, as necessary, to ensure that it is current and reflects actual facility response practices. This Contingency Plan is routinely reviewed by Hazardous Waste Management Division on an annual basis. The Plan is immediately amended whenever:

- The LLNL Resource Conservation and Recovery Act (RCRA) Part B Permit Application is revised or the issued permit is significantly modified
- Applicable federal regulations are revised
- The Contingency Plan fails in an emergency

- The Area 612 Facility changes its design, construction, operation, maintenance or other circumstances in a way that increases the potential for fires, explosions, or releases of hazardous, toxic, or mixed radioactive waste, or changes the response necessary in an emergency
- The list of emergency coordinators changes
- The list of emergency equipment changes.

2. FACILITY DESCRIPTION

This section of the Contingency Plan includes a basic description of the Area 612 Facility, a site plan, and a brief description of facility operation and treatment units.

2.1 Basic Description

EPA ID No.:

CA 2890012584

Site Operators:

Regents, University of California
U.S. Department of Energy

Mailing Address:

Lawrence Livermore National Laboratory
P.O. Box 808
Livermore, CA 94551

Facility Name:

Area 612 Facility

Division:

Hazardous Waste Management Division

Department:

Environmental Protection Department

Location:

7000 East Avenue
Livermore, CA 94551

Contact:

Dennis K. Fisher
Associate Director, Plant Operations

Address:

Lawrence Livermore National Laboratory
P.O. Box 808 (L-668)
Livermore, CA 94551
Ph.: (510) 422-3343

Owner:

U.S. Department of Energy

Address:

Department of Energy,
Oakland Operations Office
1301 Clay Street, Suite 700N
Oakland, CA 94612-5208

Contact:

James T. Davis
Assistant Manager for Environmental Management and Support
Department of Energy, Oakland Operations Office
Oakland, CA 94612-5208
Ph.: (510) 637-1587

2.2 Site Plan

The Area 612 Facility is located in the southeast area of the LLNL Main Site, close to the Area 514 Facility (see Figure 2-1).

2.2.1 Cross Reference

The Part B permit application includes designations for specific hazardous waste management units that are different from the units' building designations assigned by LLNL. The hazardous waste management unit designations were created to simplify the permit application. A cross reference identifying the hazardous waste management unit designations specified in this permit application and the units' corresponding building designations is provided below. For hazardous waste management unit designations that are not identified below, the permit application uses the same designation as the corresponding LLNL building designation.

<u>Part B Designation</u>	<u>LLNL Building Designation</u>
Area 612-1 Container Storage Unit	Building T6197 & T6198 (Tents)
Area 612-4 Container Storage Unit	Building 612A
Area 612-5 Container Storage Unit	Building T6197B (Tent)
Area 514-3 Container Storage Unit	Building 514A
Area 514-1 & 514-2 Container Storage Units	Building 513A

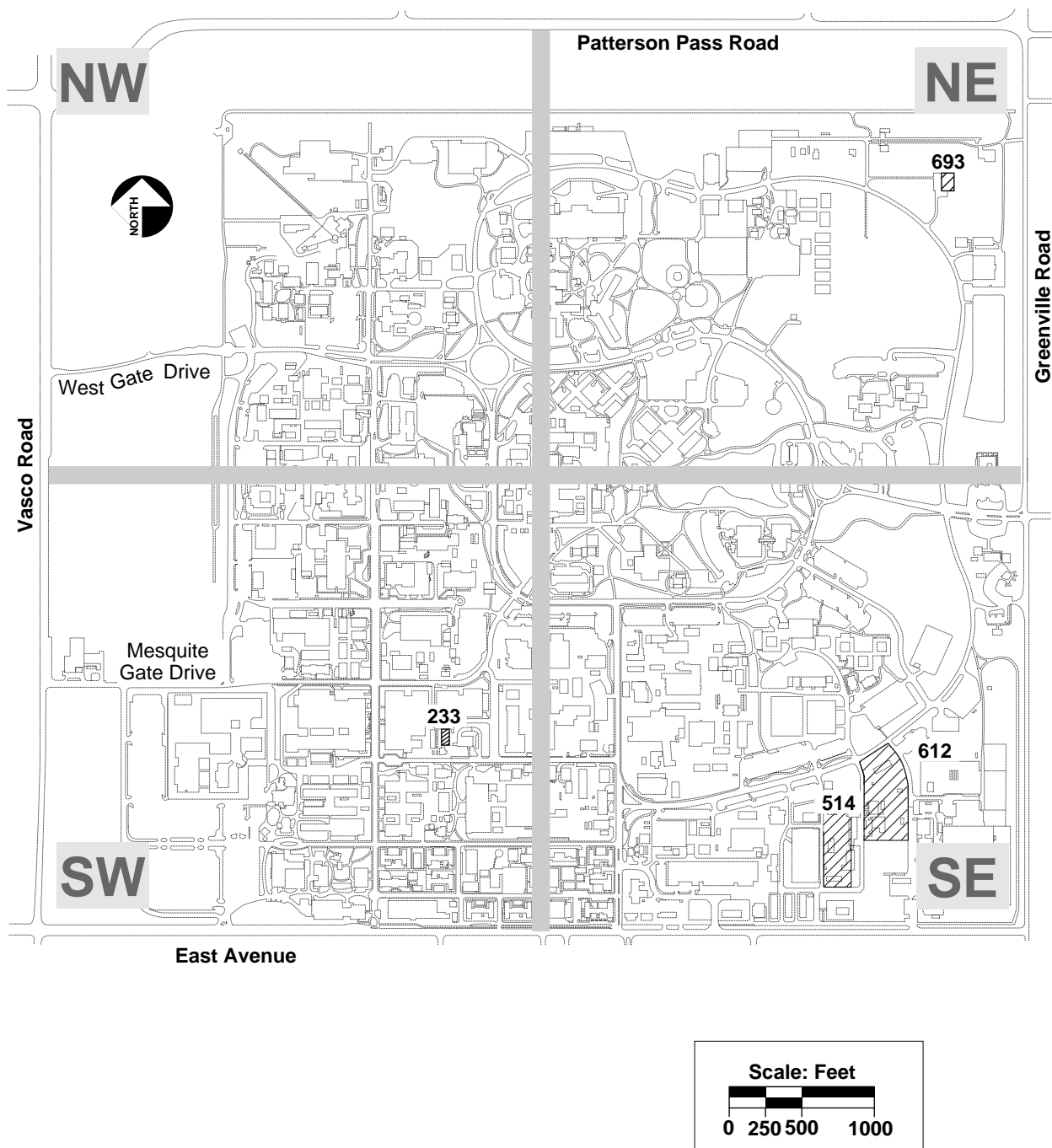


Figure 2-1. LLNL Main Site Map Showing Locations of the Hazardous Waste Management Facilities

2.3

Facility Operations

The Area 612 Facility (see Figure 2-2) is one of four Hazardous Waste Management Facilities at LLNL which contain waste management units subject to permitting requirements. The other three are the Area 514 Facility , Building 693 Container Storage Unit, and Building 233 Container Storage Unit (each hazardous waste facility or area has its own specific Contingency Plan). The Area 612 Facility is designed to manage hazardous, radioactive, toxic, and mixed waste streams generated by LLNL's research and support organizations. Waste streams include, but are not limited to: spent plating solutions, rinse waters, machine shop wastes, acids, caustics, photographic chemicals, solvents, oils, medical wastes, and miscellaneous laboratory solutions and chemicals.

Specifically designated units in the Area 612 Facility are also designed to manage polychlorinated biphenyl's (PCB) and PCB-contaminated (less than 50 ppm) materials, asbestos debris, mixed wastes, low-level radioactive wastes, and transuranic wastes in addition to the above-mentioned waste streams. Building 625 within the Area 612 Facility is specifically designed to manage PCB's in accordance with TSCA regulatory requirements. Wastes handled in this facility are regulated under the following agencies: the U.S. Environmental Protection Agency (EPA), California State Department of Toxic Substances Control (DTSC), California Department of Health Services (CDHS) and the U.S. Department of Energy (DOE).

Specific activities conducted in the Area 612 Facility involve lab packing, waste packaging, container storage, size reduction, drum crushing, and preparation of toxic, hazardous and radioactive waste for shipment to off-site permitted facilities. The hazardous waste management units within the Area 612 Facility are designed and operated to minimize exposure of workers and the environment to toxic, hazardous, radioactive, and mixed waste constituents. (See Part XIV of the Part B permit application for details of operation and design.)

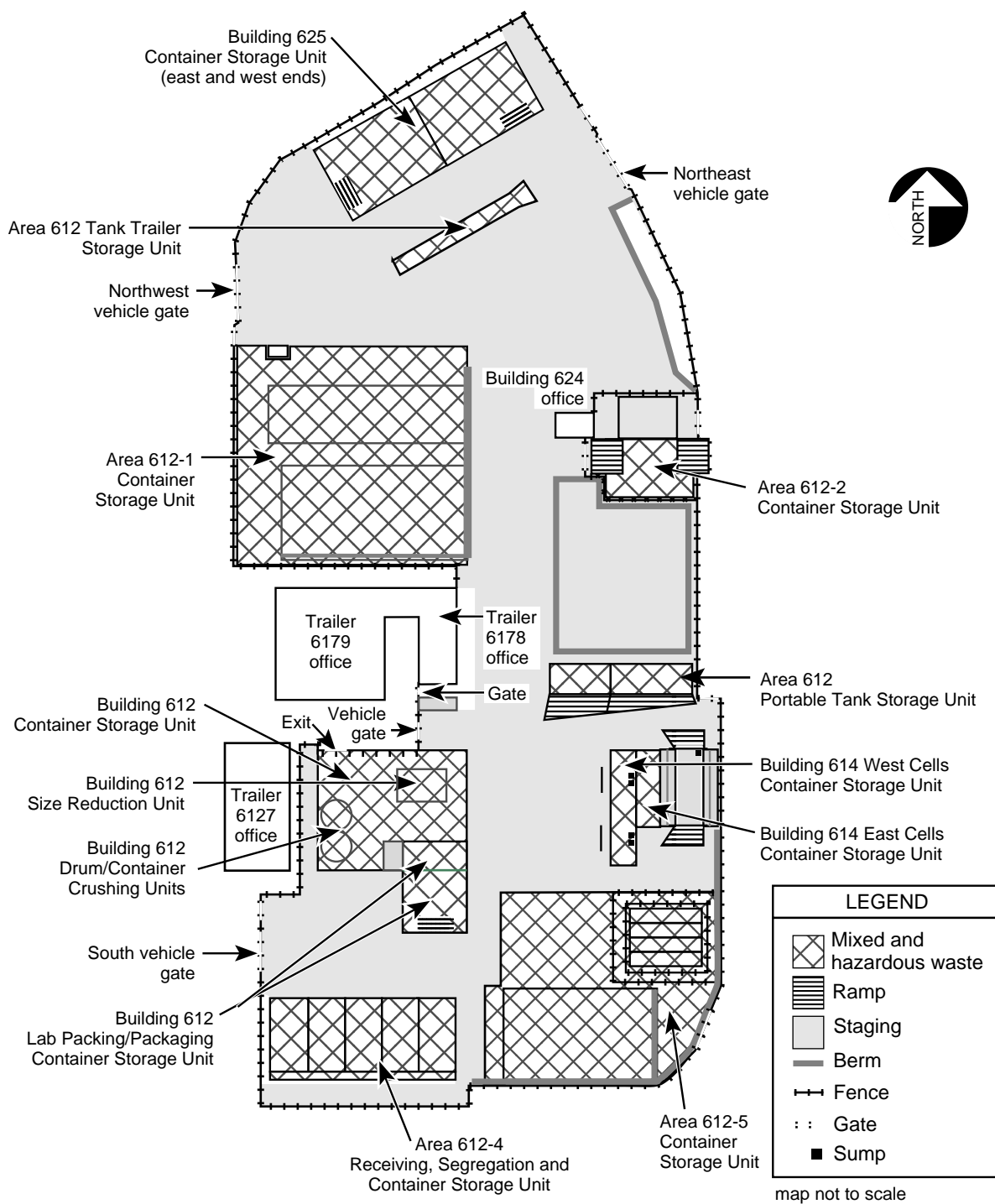


Figure 2-2. Area 612 Facility Layout

The waste management units located in the Area 612 Facility include the following:

- Area 612 Portable Tank Storage Unit
- Area 612 Tank Trailer Storage Unit
- Area 612-1 Container Storage Unit
- Area 612-2 Container Storage Unit
- Area 612-4 Receiving, Segregation, and Container Storage Unit
- Area 612-5 Container Storage Unit
- Building 612 Lab Packing/Packaging Container Storage Unit
- Building 612 Drum/Container Crushing Units
- Building 612 Size Reduction Unit (proposed)
- Building 612 Container Storage Unit
- Building 614 West Cells Container Storage Unit
- Building 614 East Cells Container Storage Unit
- Building 625 Container Storage Unit.

3. HAZARD PREVENTION

This section outlines various hazard prevention efforts. Specifically, the LLNL approaches for preventing hazardous run-on and run-off, releases to the atmosphere, and undue exposure to employees are discussed.

3.1 Run-On and Run-Off Control—Hazard Prevention

Although LLNL is not located in a flood zone, the Area 612 Facility contains run-on control structures to protect hazardous, toxic, radioactive, and mixed waste management units from storm water. These include: berms; grades that slope away from the units; roofs, tents, or structures over units; and storm drains. Berms are engineered structures that may be curbing, foundations, and ramp systems. Run-off control structures such as berms are located at the Area 612 Facility to control releases and collect rain water that may be contaminated with hazardous residues. Each liquid container storage unit is equipped with secondary containment that is impervious to the wastes stored and is sloped so that any surface run-off or releases will accumulate in a given area to facilitate liquid removal operations.

Accidental spillage of radioactive or hazardous materials within bermed areas is removed in a timely manner. All liquids captured in the basins, including rain and rinse water, are sampled and analyzed in accordance with Part III.3.6.12 of the Part B permit application, unless the source of a release is readily traceable to a particular container. Since the contents of the container are known and are on record, waste sampling and analysis is not necessary.

3.2 Releases to the Atmosphere—Hazard Prevention

All employees handling hazardous, radioactive, or mixed wastes are required to conform to the guidelines expressed in the Hazardous Waste Management Facility Safety Procedures (FSPs) and Standard Operating Procedures (SOPs). Hazardous gases, mists, or vapors are minimized or prevented by following the waste handling procedures and by:

- Using hoses and locking connections for transfer of wastes via pumps from tanker trucks or containers into receiving containers
- Inspecting waste containers on a routine basis to detect releases, leaks, or integrity problems that could result in waste releases (these routine inspections provide for timely detection and mitigation of such releases)
- Some containers are fitted with venting devices (e.g., carbon adsorption containers)
- Administratively controlling waste bulking operations to avoid potential mixing of incompatible wastes in containers
- Segregating incompatible wastes
- Keeping containers closed except when adding or removing waste
- Proper selection of containers that are compatible with the waste
- Using high-efficiency particulate air (HEPA) filters on hazardous exhausts (e.g., the Building 612 Drum/Container Crushing Units).

In the event of an accidental release to the environment, release response would be implemented and if the incident is declared Level 3 or greater, the LLNL Atmospheric Release Advisory Capability (ARAC) system would be utilized. The LLNL ARAC system would also be activated for an air release greater than the CERCLA Reportable Quantity, or if an LLNL Industrial Hygienist determines that an on-site release has an effect off-site.

ARAC is a system designed to estimate the effects and atmospheric dispersion of hazardous and radioactive waste releases within the immediate area surrounding a release or within Northern California. The ARAC Central Facility is equipped

to perform detailed atmospheric dispersion calculations, allowing an accurate tracing of hazardous and radioactive waste dispersion. The capability of this system allows the various response teams to have information on any hazardous and radioactive waste concentrations resulting from an accidental release.

Additional near-event dispersion calculations are available from the LLNL Hazards Control Industrial Hygiene Group.

3.3 Undue Exposure to Employees—Hazard Prevention

Personnel are protected from undue exposure to hazardous, toxic, radioactive, and mixed waste by administrative controls, following written procedures, personal protective equipment, and engineered controls. Medical evaluations are conducted on a regular basis for HWM personnel working within the hazardous waste facilities.

3.3.1 Administrative Controls

Any new potentially hazardous operation must be thoroughly evaluated by the LLNL Hazards Control Department prior to commencement. Procedures for the safe handling of specific chemicals and groups of chemicals are described in Chapter 21 of the *LLNL Health and Safety Manual*.

Operations at the Area 612 Facility are conducted using approved written procedures. Facility Safety Procedures (FSP-612) are the basic safety ground rules to be followed by all personnel present within a building or area. FSPs are reviewed every three years. FSP-612, *Radioactive and Hazardous Waste Treatment and Storage Facilities: The 612 Complex and Building 693* includes:

- A description of an anticipated activity and its hazards and risks
- The name of the individual responsible for ensuring compliance with the FSP
- Instructions to be followed to implement the controls that will reduce the risks to an acceptable level
- Information concerning any special conditions that may be present.

Each Hazardous Waste Management Division employee responsible for handling hazardous and mixed waste and assigned to the Area 612 Facility is required to read FSP-612. The FSP planning and preparation process is described in the *LLNL Health and Safety Manual*, Chapter 2, “Work Planning and Safety Procedures.” In addition, as part of HWM’s Training Program, each HWM employee is a participant in the HWM Reading Program which requires personnel to read FSPs, Contingency Plans, and Self-Help Plans.

In addition to the broad safety guidelines presented in the FSP, safety requirements specific to a hazardous waste operation are presented in Hazardous Waste Management Division Operational Safety Procedures (OSPs) and Standard Operating

Procedures (SOPs). Hazardous Waste Management Division personnel must be familiar with each procedure applicable to a given operation before performing the work.

Personnel handling waste must also complete specialized training in accordance with 29CFR1910.120, T22-66264.16, and T22-66265.16. The 24-hour HAZWOPER course is mandatory, in addition to the eight-hour annual refresher course. The On-the-Job Training (OJT) Program and other specialized training courses must be completed by Hazardous Waste Management Division Operations Technicians and Technologists. For details, see Part VII and Part VIII of the Part B Permit Application.

All programs, facilities, and buildings are subject to audits and evaluations by Hazards Control personnel. Results of these audits are forwarded to the appropriate department so that any deficiencies can be corrected. Hazards Control personnel also audit the effectiveness of the ES&H teams and other Hazards Control services to ensure that they are providing the proper support to operating personnel. Records of these audits are maintained by Hazards Control.

3.3.2 Personal Protective Equipment (PPE)

Safety glasses and solid-toe safety shoes are required to be worn at all times when working in waste management operational areas. Booties are worn over safety shoes for certain activities, such as decontamination, or in designated areas where radioactive containers are opened. Coveralls or equivalent are required to be worn at all times by operators handling waste containers. Leather, acid-, base-, or solvent-resistant gloves are worn as appropriate for the waste handling activity. Face shields, goggles, or other facial and eye protection is required to be worn in accordance with the FSPs and OSPs when handling open containers of liquid waste.

Employees are issued respirators with filter cartridges based on information provided in a specific procedure or under the direction of an Environmental, Safety, and Health (ES&H) Team Industrial Hygienist. Level 1,2,3, or 4 PPE is assigned based on the type of activity.

If specified PPE is not available at the facility, and no approved substitute is available, then work is delayed until adequate equipment is obtained. For more details on PPE available at the facility, see Section 7.4.4. For information on Personal Protective Equipment Guidelines, See Appendix A.

3.3.3 Engineered Controls

Engineered controls in the Area 612 Facility include a HEPA filtered fume hood in Building 612, a walk-in lab pack booth in room 105, turbine air ventilators on the roof of Building 625, and electric fans in the Building 614 West Cells Container Storage Unit.

Many of the waste container storage areas (e.g., 612-1, 612-2, 612-4, 612-5) have open air ventilation. Roll-up doors are installed at the Building 625 and the

Building 612 Container Storage Area. Electronic gates provide manual and automatic access to the Area 612 Facility. Lighting is installed within the Building 625 and Building 612 Container Storage Areas. Eyewash and showers are present throughout the Area 612 Facility.

A HEPA filter is connected to the Building 612 Drum/Container Crushing Unit to protect individuals from exposure to toxic particles or radioisotopes that may be released as a result of the crushing process. Room 105 is a walk-in hood that is used to protect personnel from toxic particulates.

The criteria for use of hoods and enclosures when radioactive or hazardous materials are being handled are outlined in the *LLNL Health and Safety Manual*, Chapter 33, “Radiation-Ionizing”; Manual Supplement 33.42, “Workplaces for Radionuclides”; and Manual Supplement 12.03, “Work Enclosures for Toxic and Radioactive Materials.” In addition, the following tests are also conducted:

- Exhaust flow is tested by Hazards Control personnel on a scheduled basis; air flow indicators are utilized to confirm that exhaust fans are operating adequately whenever a hood or enclosure is used
- HEPA filters on hoods and enclosures are tested for filtering efficiency on a scheduled basis by Hazards Control personnel.

Forklifts are used to move large loads on pallets or skids. Drum dollies are used to move individual drums. Ramps and elevated grades were constructed to facilitate the ease and safe access of forklifts and other equipment bearing waste containers to the storage and treatment units. This construction helps prevent hazards in loading and unloading operations and consequent undue exposure of personnel to hazardous, radioactive, or mixed waste releases.

The hazardous waste container units within the Area 612 Facility have been constructed to minimize the potential for accidental releases and run-on of rainwater. Most of these waste container units have sloping extension grades and some with interior ramps. Berms, curbing, foundations, and ramp systems, have also been installed to prevent rainwater run-on and to help in segregating any accidental releases.

4. RESPONSIBILITIES DURING AN EMERGENCY

This section presents the responsibilities of Hazardous Waste Management Division emergency response staff and support organizations, in addition to the LLNL Emergency Response Organization. Individuals designated in Table 4-1 may be selected as Emergency Coordinator during an emergency incident. For Level 1 incidents the Area 612 Facility Supervisor or designated alternate is the Emergency Coordinator, and for Level 2, 3, and 4 incidents, a Fire Chief is the Emergency Coordinator.

Table 4-1. Emergency Call List

Hazardous Waste Management Division*		Duty Fire Chiefs†			
Title	Facility Supervisor	Fire Chief (primary)	Assistant Fire Chief (alt. 1)	Assistant Fire Chief (alt. 2)	Assistant Fire Chief (alt. 3)
Name	Collin Jones	John Sharry	John Loverin	Jerry Sandoval	Ralph Buntlin
Dial Page	37777-01727	37700-01800	37700-01802	37700-01804	37700-01803
Work Phone	(510) 423-4597	(510) 423-1800	(510) 423-1802	(510) 423-1804	(510) 423-1803
Work Address	7000 East Ave. Livermore, CA 94551	7000 East Ave. Livermore, CA 94551	7000 East Ave. Livermore, CA 94551	7000 East Ave. Livermore, CA 94551	7000 East Ave. Livermore, CA 94551
L-Code	L-620	L-388	L-388	L-388	L-388
Home Phone	(209) 982-5050	(510) 373-1926	(510) 447-6855	(510) 443-0797	(408) 475-3840
Home Address	14099 Southport Lathrop, CA 95330	5116 Teresa Way Livermore, CA 94550	1865 DeVaca Way Livermore, CA 94550	5175 Irene Way Livermore, CA 94550	615 Burlingame Ave., Capitola, CA 95010
Note: For assistance during off-shift hours, contact Fire Department Dispatcher on ext 911.					

*Emergency Coordinator for Level 1 Incidents.

†Emergency Coordinator for Level 2, 3, or 4 Incidents.

4.1 Emergency Coordinator (LLNL Incident Commander)

The LLNL Incident Commander fulfills the responsibility of Emergency Coordinator pursuant to State and Federal regulations. The Incident Commander coordinates all emergency responses.

Level 1 incidents are handled by the Hazardous Waste Management Division with the Area 612 Facility Operations Supervisor or alternate as the Incident Commander. He or she is responsible for assessing emergency conditions, safeguarding Area 612 Facility personnel, making the initial emergency classification, initiating on-site response activities, and requesting help from support organizations. He or she coordinates all emergency response measures and has the authority to commit resources needed to mitigate Level 1 incidents as

described in this Contingency Plan. Response procedures for Level 1 incidents are included in this document to provide guidance for Hazardous Waste Management personnel. This Contingency Plan is not considered to be implemented for Level 1 incident mitigation.

For Level 2, 3, and 4 incidents, the Fire Department is contacted. For these emergencies, the first or senior Fire Department Officer dispatched to or present at the incident site becomes the Incident Commander until relieved by a Chief Officer. The Chief Officer then becomes the Incident Commander. The Incident Commander is responsible for assessing the emergency conditions, making the initial emergency level classification, initiating on-site response activities, and requesting support from off-site organizations. On-scene operational control for life, safety, rescue, fire control and extinguishment, release control, decontamination zones, and containment, and property conservation and salvage is provided by the Incident Commander at all times. He or she also directs the efforts of the Emergency Response Organization to identify material released and to assess potential or actual health consequences. The Incident Commander coordinates all emergency response measures and has the authority to commit resources needed to carry out this Contingency Plan and the LLNL *Draft Emergency Plan*.

Personnel qualified to act as Incident Commander are always on the premises. The LLNL Fire Department maintains a 24-hour staff and is available to assume the role of Incident Commander at all times, for all level incidents.

4.2 Hazardous Waste Management Division Emergency Contacts

Hazardous Waste Management Division personnel are prepared to respond in an emergency, including the Area 612 Facility Supervisor, Operations Technicians and Technologists, and Waste Operations Section Leader. Other Hazardous Waste Management Division personnel with responsibilities that affect the emergency response capability include the Support Services Supervisor and the Facilities & Assessments Section Leader.

For Level 1 incidents, Hazardous Waste Management Division can request assistance from emergency support organizations, which include: the Hazards Control ES&H Team, the Environmental Operations Group Environmental Analyst, and the Wastewater Guidance and Monitoring Group.

The Hazardous Waste Management Division also provides equipment and personnel to support the Incident Commander (Fire Chief), when requested, for release containment and cleanup during Level 2, 3, and 4 incidents occurring on-site. The Hazardous Waste Management Division maintains a ready supply of emergency response equipment in a specially equipped release response trailer.

4.2.1 Hazardous Waste Management Division Area 612 Facility Supervisor or Alternate

Specifically, the following are the responsibilities of the Hazardous Waste Management Division Facility Supervisor (or alternate) for all emergency incidents in the Area 612 Facility:

- For Level 1 incidents:
 - Maintain own safety and that of all personnel in the area
 - Acts as the Incident Commander, as described in Section 4.1
 - Ensures that the Environmental Operations Group Environmental Analyst and the Health and Safety Technician have been notified
 - Ensures that all normal waste handling operations cease in areas within and bordering the release until cleanup procedures are completed to avoid contact of incompatible waste with released material
 - Directs the collection and containment of released wastes and the removal or isolation of incompatible waste containers
 - Ensures that all releases are internally reported by Hazardous Waste Management Division Operations Technicians/Technologists
 - Monitors for leaks, pressure build-up, gas generation, or ruptures in valves, pipes or other equipment, wherever applicable
 - Provides for treatment, storage, or disposal of recovered hazardous, radioactive, or mixed wastes or material, contaminated soil, or surface water, in accordance with all applicable regulations
 - Ensures that adequate decontamination areas and equipment are established for personnel
 - Ensures that all emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use before operations are resumed.
- For Level 2, 3, and 4 incidents:
 - Evaluates the immediate scope of the incident
 - Initiates evacuation of Facility personnel, if necessary (activates the Area 612 Facility paging system)
 - Notifies the LLNL Fire Department
 - Takes appropriate action to safeguard Area 612 Facility personnel
 - Ensures that the Environmental Operations Group Environmental Analyst and the Health and Safety Technician have been notified

- Directs area personnel in accordance with the Facility Safety Procedures (FSP) and Contingency Plan as temporary Incident Commander, until the Fire Department and the official Incident Commander arrive
- Ensures that all normal waste handling operations cease in areas within and bordering the release until cleanup procedures are completed to avoid contact of incompatible waste with released material
- Assists the Incident Commander and provides appropriate direction to Area 612 Facility personnel who are lending support
- Ensures personnel and equipment are properly decontaminated
- Ensures that all Hazardous Waste Management Division emergency equipment listed in the Contingency Plan is cleaned and fit for its intended use before operations are resumed.
- Preventative maintenance responsibility:
 - Ensures that all emergency response equipment and spill kit contents are properly maintained, sufficiently stocked, and in good working order.

4.2.2 Hazardous Waste Management Division Operations Technicians and Technologists

The following are the responsibilities of the Operations Technicians and Technologists during an emergency incident:

- For a Level 1 incident:
 - Maintain own safety
 - Observe the two-person rule — never work alone
 - For release response, follow the Ten-Step Plan (described in Section 6.2.6); listen carefully to instructions from the Incident Commander (Area 612 Facility Operations Supervisor or alternate)
 - Immediately report any injuries, incidents, and unsafe conditions to the Incident Commander
 - Stop any Hazardous Waste Management Division release cleanup operation when there appears to be danger to personnel, property, or the environment, and should notify the Incident Commander and Facility Supervisor for assistance

- Ensure that Level 1 releases are internally reported.
- For Level 2, 3, and 4 incidents:
 - Maintain own safety
 - Notify Area 612 Facility Supervisor or alternate (in case of extremely hazardous, life threatening situation, immediately notify facility personnel on the Area 612 Facility paging system or activate the incident alarm)
 - For Level 2, 3, or 4 releases, if safe, follow the first five steps of the Ten-Step Plan (described in Section 6.2.6) while waiting for the LLNL Fire Department to arrive
 - Observe the two-person rule — never work alone
 - Provide assistance to the Incident Commander (LLNL Fire Chief), as requested, for release cleanup
 - Listen carefully to instructions from the Incident Commander and Area 612 Facility Operations Supervisor
 - Ensure that release residue and contaminated disposable clothing and equipment are discarded appropriately
 - Ensure that all incidents are properly documented.

4.2.3 Hazardous Waste Management Division Waste Operations Section Leader

The following are the responsibilities of the Waste Operations Section Leader during an emergency incident:

- Coordinates remediation efforts as directed by the Incident Commander or the Environmental Operations Group Environmental Analyst
- Provides technical support to the Emergency Control Organization regarding Hazardous Waste Management Facilities and operations
- Ensures that any reportable release is properly documented and notification is given to the Environmental Protection Department management.

4.2.4 Hazardous Waste Management Division Support Services Supervisor

The Hazardous Waste Management Division Support Services Supervisor is responsible for maintaining the operational readiness of the emergency equipment at the Area 612 Facility to ensure proper working order.

4.2.5 Hazardous Waste Management Division Facilities & Assessments Section Leader

The Hazardous Waste Management Division Facilities & Assessments Section Leader or designee is responsible for preparing, reviewing, and updating the Contingency Plan.

4.3 Support Organizations

4.3.1 Hazards Control ES&H Team

Members of the Hazards Control ES&H Team may be called in to advise and support the Hazardous Waste Management Division in mitigating Level 1 emergency incidents. This team consists of specialists in the following fields: Industrial Hygiene, Industrial Safety, Health Physics, Environmental Protection, Explosives Safety, Fire Protection Engineering, and Criticality Safety.

The Incident Commander of Level 2, 3, and 4 incidents can also call on the Hazards Control ES&H Team as provided above for professional advice and, in addition, can activate the Hazard Control Satellite Operations Center and the Emergency Management Center (EMC) if additional support is needed. This organization is described in more detail in the LLNL *Draft Emergency Plan*.

4.3.1.1 Hazards Control ES&H Team Leader

The following are the responsibilities of the Hazards Control ES&H Team Leader or alternate. For Level 1 incidents:

- Helps dispatch the appropriate Hazards Control Department representative to advise and support Hazardous Waste Management Division in mitigating Level 1 emergency incidents (this includes, but is not limited to, an Industrial Hygienist for chemical hazards assessments and PPE advice, and a Health Physicist for assessment and advice regarding released radioactive or mixed wastes).

For a Level 2, 3, or 4 incidents:

- Assembles the ES&H Team at the Command Post or at a specified Assembly Area
- Relays the field status of the emergency response to the Incident Commander

- Coordinates team member responses in their respective disciplines
- Provides a unified assessment of field conditions and actual or potential health effects based on team member evaluation of the incident
- Establishes proper level of PPE based on evaluations
- Establishes levels of contamination
- Advises the Emergency Response Organization on appropriate protective measures based on field evaluations.

4.3.1.2 Environmental Operations Group Environmental Analyst

The Environmental Operations Group Environmental Analyst represents the Environmental Protection Department on the Hazards Control ES&H Team. This individual supports the Hazardous Waste Management Division. The Environmental Operations Group Environmental Analyst's responsibilities during an incident (Level 1 through 4) are:

- Responds to emergency incidents and determines the actual or potential environmental impacts
- Directs and assists with the collection of samples in an area with a contaminated release, collects samples after cleanup to verify that cleanup is complete, and determines whether remediation work is necessary
- Prepares an Environmental Protection Department Environmental Incident Report
- Determines whether the release needs to be reported to regulatory agencies
- Notifies LLNL management and/or the appropriate regulatory agencies of the incident as directed by the Operations and Regulatory Affairs Division Leader.

4.4 LLNL Fire Safety Division—Emergency Operations Group

The LLNL Fire Safety Division (Fire Department) is called for Level 2, 3, and 4 incidents. The Fire Safety Division is composed of an Administrative Group and an Emergency Operations Group. The Emergency Operations Group acts as the first responder to Level 2, 3, and 4 incidents and is responsible for invoking the incident-command organization.

The first fire officer to arrive at the scene assumes the Incident Commander role until relieved by a Chief Officer. The Incident Commander's specific responsibilities during a Level 2, 3, or 4 incident are as follows:

- Acts as Incident Commander as described in Section 4.1 for Level 2, 3, and 4 incidents (and as described in the *Draft Emergency Plan*)
- Activates the LLNL Emergency Paging System to notify personnel in selected areas of LLNL or the entire LLNL population, if necessary. Initiates evacuation of personnel, if appropriate
- Notifies appropriate State or local agencies with designated response roles if their help is needed (enlists support from agencies that participate in the Mutual Aid Agreement. If necessary, ensures that the State Office of Emergency Services has been notified)
- Prevents the occurrence, recurrence, and spread of fire, explosion, and waste release by stopping all waste handling processes and operations in the area
- Directs the collection and containment of released waste and the removal or isolation of incompatible waste containers
- Directs monitoring activities for leaks, pressure buildups, gas generation, or ruptures in valves, pipes, or other equipment, whenever this is appropriate
- Ensures that all recovered wastes or material, contaminated soil, or surface water is treated, stored, or disposed of in accordance with all applicable regulations (may delegate this responsibility to the Area 612 Facility Supervisor)
- Ensures personnel are properly decontaminated before being released from an incident.
- Ensures that all emergency equipment used to mitigate the incident is cleaned and fit for its intended use before operations are resumed (may delegate the cleanup of Hazardous Waste Management Division emergency equipment to the Area 612 Facility Supervisor)
- Ensures that all required notifications to outside agencies take place.

The LLNL Emergency Response Organization is discussed in detail in the *LLNL Draft Emergency Plan*.

5. ARRANGEMENTS WITH LOCAL AUTHORITIES

LLNL has agreements with many off-site local authorities including fire departments, medical facilities, and law enforcement agencies. These authorities will provide assistance in the event of emergencies that cannot be handled by LLNL internal emergency response organizations. These include Mutual Aid Agreements, Emergency Medical Services agreements, Law Enforcement Assistance Agreements, and Memoranda of Understanding.

5.1 Fire Protection

The LLNL Fire Department participates with local off-site fire departments in the Tri-Valley Mutual Aid agreement. A list of the primary local fire department participants is presented in Table 5-1. The Tri-Valley agencies comprise the East Zone of Alameda County; the remainder of the county is divided into the north and south zones. The LLNL Fire Department is the coordinating department for mutual aid in the Tri-Valley as well as Alameda County as a whole. The LLNL Fire Dispatcher, backed up by Alameda County Fire Dispatcher, is responsible for dispatching the various fire units and ascertaining that all jurisdictions have some fire protection, as allocated through pre-determined response assignments. In the event that a fire cannot be mitigated with the facilities of any one of the Tri-Valley agreement participants, the other contracting participants shall upon request furnish aid (personnel and equipment) to protect life and property from fire.

Each party reserves the right to determine the extent of assistance it will furnish, including the right to refuse to provide assistance when the agencies' own fire protection needs are such that equipment or personnel may not be safely released for service elsewhere. The Fire Chief of the City of Livermore is designated as administrator of the agreement. The agreement will remain in full force and effect without renewing, except that any party may withdraw by giving 30 days written notice.

LLNL is also signatory to an automatic aid agreement with the City of Livermore Fire Department, which provides automatic response on a first alarm basis. In addition, the City of Pleasanton and the Alameda County Fire Patrol provide assistance on a secondary and as-needed basis, respectively.

Copies of all agreements with off-site fire agencies are maintained by LLNL's Fire Department.

Table 5-1. Participants in the Tri-Valley Mutual Aid Agreement

California Department of Forestry Castle Rock and Sunol Stations Contact Morgan Hill Fire Dispatch 15670 Monterey Street Morgan Hill, CA 95037 (408) 779-2121	City of Livermore Fire Department 4550 East Avenue Livermore, CA 94550 (510) 373-5450
City of Pleasanton Fire Department 4444 Railroad Avenue Pleasanton, CA 94566 (510) 484-8114	Alameda County Fire Patrol Office of Emergency Services 1617 College Avenue Livermore, CA 94550 (510) 447-6611
Dougherty Fire Authority 9399 Firecrest Lane San Ramon, CA 94583 (510) 829-2333	Valley Fire Protection District San Ramon 1500 Bollinger Canyon Road San Ramon, CA 94583 (510) 838-6640
Camp Parks Fire Department 636 Fifth Street Dublin, CA 94568 (510) 828-2057	Veterans Administration Hospital Fire Department 4951 Arroyo Road Livermore, CA 94550 (510) 447-2560, Extension 6188

Each party reserves the right to determine the extent of assistance it will furnish, including the right to refuse to provide assistance when the agencies' own fire protection needs are such that equipment or personnel may not be safely released for service elsewhere. The Fire Chief of the City of Livermore is designated as administrator of the agreement. The agreement will remain in full force and effect without renewing, except that any party may withdraw by giving 30 days written notice.

LLNL is also signatory to an automatic aid agreement with the City of Livermore Fire Department, which provides automatic response on a first alarm basis. In addition, the City of Pleasanton and the Alameda County Fire Patrol provide assistance on a secondary and as-needed basis, respectively.

Copies of all agreements with off-site fire agencies are maintained by LLNL's Fire Department.

5.2 Emergency Medical Service

The LLNL Fire Department is also an emergency medical service (EMS) first responder. The LLNL Health Services Department has hospital facilities and a decontamination unit at Building 663. An individual contaminated with hazardous substances may be brought to the facility to undergo decontamination and emergency medical treatment. Emergency response personnel are regulated by State and County EMS policies and procedures. LLNL is signatory to the Alameda County EMS system for Zone IX. The EMS is a dynamic mix of private and public health care providers working together to improve the quality of patient care in the pre-hospital and hospital settings. Pre-hospital care providers include:

- Dispatchers
- Police personnel
- Fire personnel
- Ambulance personnel
- Mobile intensive care nurses
- Base hospital physicians.

Participants in the Alameda County EMS for Zone IX are presented in Table 5-2.

Table 5-2. Receiving Hospitals in the Alameda County Emergency Medical Service*

Hospital	Capabilities
Alameda Hospital 2070 Clinton Avenue Alameda, CA 94501 522-3700	OB-Gyn Basic EMT/FR Base
Alta Bates 3001 Colby Street Berkeley, CA 94705 540-0337	Basic OB-Gyn IC Nursery Burn Unit 5150 Designation
Children's Hospital 747 – 52nd Street Oakland, CA 94609 428-3000	Pediatric Cases only Trauma Center, IC Nursery Cardiovascular Surgery Pediatric ICU
Eden Hospital 20103 Lake Chabot Road Castro Valley, CA 94546 537-1234	Trauma Center 5150 Designation OB-Gyn EMT FRH Base EMS LS (Landing) Helipad
Highland General Hospital 1411 E. 31st Street Oakland, CA 94602 437-4557	Trauma Center OB-Gyn 5150 Designation Basic ICN ALS Base
Kaiser Hospital 280 W. MacArthur Blvd. Oakland, CA 94611 596-1000	OB-Gyn IC Nursery Pediatric ICU NICU (Neonatal) Basic Cardiovascular
Kaiser Hospital 27400 Hesperian Blvd. Hayward, CA 94545 784-4000	OB-Gyn IC Nursery Cardiology ALS Base
John Muir Medical Center 1601 Ygnacio Valley Road Walnut Creek, CA 94598 939-3000	Trauma Center Helipad
Oakland Naval Hospital 8750 Mountain Blvd. Oakland, CA 94627 633-5000	OB-Gyn

Table 5-2. (Continued)

Hospital	Capabilities
San Ramon Regional Medical Center 6001 Norris Canyon Road San Ramon, CA 94583 275-9200	Fully Acute Hospital
St. Rose Hospital 27200 Calaroga Avenue Hayward, CA 94545 782-6200	Helipad Fully Acute Hospital
Summit Hospital Hawthorne and Webster Sts. Oakland, CA 94609 655-4000	OB-Gyn Cardiovascular Surgery Orthopedic
Valley Care Medical Center 5655 West Las Positas Boulevard Pleasanton, CA 94588 734-3350	Basic OB/Gyn 5150 Designation ALS Base Cardiovascular EMS LS
Washington Hospital 2000 Mowry Avenue Fremont, CA 94538 797-1111	Cardiovascular Surgery OB-Gyn 5150 Designation Helipad

*The Alameda County Emergency Medical Service district office address is:

The Alameda County Health Care Services Agency
Emergency Medical Service District
55 Santa Clara Avenue, Suite 200
Oakland, CA 94610
268-7355 (not open Tuesday mornings)

5.2.1

Alameda County Medical Alert Plan (ALCO)

LLNL works closely with medical personnel of Alameda County via its countywide Emergency Medical Services (EMS) plan. Alameda County has nine zones, each with a base hospital. LLNL is located in Zone IX. Valley Memorial Hospital (VMH) is the receiving base hospital. The plan is activated when medical service needs, resulting from an incident, will overwhelm the resources of a single EMS zone. In case of a multi-casualty incident, ALCO-CMED (County Medical Emergency Dispatch/San Leandro) alerts all hospitals in the plan, the base hospital in the affected EMS zone being the coordinating body. Radio links ALCO-CMED with LLNL's Fire Safety Division and Health Services. ALCO will send ambulances to the disaster site, maintain the emergency rooms (ERs), and direct ambulances to hospital ERs. Air transportation via helicopter may be used if the overall time for transport to a hospital is reduced by at least 20 minutes over that of ground transportation. Other hospitals cancel routine services to prepare to receive patients.

The EMS District is a division of the Alameda County Health Care Services Agency, Public Health Services Department. The EMS District coordinates EMS activities in Alameda County. The Board of Supervisors (five members) makes general policy decisions affecting the EMS District. The County Health Officer is designated the EMS Medical Director by the Board of Supervisors. The County Health Officer delegates this responsibility to the EMS District. Medical control of the pre-hospital medical care within the system is the responsibility of the EMS Medical Director.

LLNL is also signatory to a Memorandum of Agreement with Valley Memorial Hospital in the City of Livermore, Valley Care Hospital in Pleasanton, and Eden Hospital (trauma center) in Castro Valley for treatment of radiologically contaminated personnel. Air transport of patients is provided by Alameda County under the Alameda County Medical Alert Plan. The decision for air transport is normally made by LLNL Health Services Department personnel, but may be made by the LLNL Fire Department, if warranted. Notification is coordinated by the LLNL dispatcher.

Copies of EMS agreements are maintained by the LLNL Fire Department.

5.3

Law Enforcement

The LLNL Safeguards and Security Department has established agreements for nonreciprocal police assistance to LLNL through the Law Enforcement Mutual Aid Agreement in Region 2. Agencies participating in this region are listed in Table 5-3.

The Alameda County Sheriff serves as coordinator and has authority to implement this agreement whenever assistance is requested of the Region 2 participants.

LLNL will seek assistance from the Law Enforcement Mutual Aid participants of Region 2 for traffic and crowd control, whenever large-scale evacuations or

public demonstrations take place. Requests for assistance from outside law agencies will be made by the LLNL Safeguards and Security Department, as appropriate.

The LLNL Safeguards and Security Department is also signatory to a Law Enforcement Assistance Agreement (LEAA) with the City of Livermore for traffic control east of (and on) Vasco Road during smaller laboratory evacuations and public demonstrations. For such disturbances along Greenville Road and East Avenue (from Greenville to Vasco Road), LLNL has a Memorandum of Understanding (MOU) with the California Highway Patrol.

The Protective Planning and Assurance Office of the LLNL Safeguards and Security Department maintains all agreements with off-site law enforcement agencies.

Table 5-3. Law Enforcement Mutual Aid Agreement in Region 2

Alameda County Courthouse 1225 Fallon St., Room 103 Oakland, CA 94612-4381	California Highway Patrol Golden Gate Division 1551 Benicia Road Vallejo, CA 94591
City of Livermore Police Department 1050 South Livermore Avenue Livermore, CA 94550	San Joaquin County Sheriff Department 7000 S. Michael Canlis Blvd. French Camp, CA 95231
Sandia National Laboratories, Livermore Physical Security Organization 8531, Building 912, Room 091 East Avenue Livermore, CA 94550	Federal Bureau of Investigation San Francisco Office 450 Golden Gate Avenue P.O. Box 36015 San Francisco, CA 94102

5.4 Miscellaneous Agreements

LLNL also participates in numerous other mutual aid agreements. These include: the State of California Office of Emergency Services, City of Livermore (Automatic Aid Agreement), City of Tracy, University of California and State of California (Master Mutual Aid Agreement).

5.5 Distribution of Contingency Plans and Emergency Response Information

Contingency Plans from each of the Hazardous Waste Management Facilities are sent to LLNL's Fire Department, Health Services Department, and Safeguards and Security Department. These departments coordinate all emergency response activities with off-site emergency responders and, therefore, will transmit all pertinent information to affiliated off-site agencies, as warranted by the emergency situation.

Pertinent off-site agencies are sent copies of Hazardous Waste Management Facility Contingency Plans. These agencies include: all participants in the Tri-Valley Mutual Aid Agreement, the Alameda County EMS District Office, Valley Memorial

Hospital, The Alameda County Sheriff's Office, and the City of Livermore Police Department.

The LLNL Fire Department is familiar with the layout of all Hazardous Waste Management Facilities and, therefore, with the locations where Hazardous Waste Management Division operational personnel will be working. Both the LLNL Fire Department and the LLNL Health Services Department are familiar with the types of injuries or illnesses which could result from fires, explosions, or releases from the Hazardous Waste Management Facilities.

The LLNL Fire Department and the Safeguards and Security Department are familiar with all entrances to the Hazardous Waste Management Facilities and the LLNL site, and with all possible evacuation routes.

Evacuation routes from the Hazardous Waste Management Facilities are presented in Section 8 of each Facility Contingency Plan. Evacuation from the overall LLNL site is presented as Appendix VIII-E of the Part B permit application and in LLNL's *Draft Emergency Plan*.

6. EMERGENCY CONTROL PROCEDURES

Response to an emergency at the Area 612 Facility is designed to be at a level appropriate to the incident. The transition from one level of emergency to another must be automatic and keyed to well-defined criteria. Emergency action levels are defined based on the event and the potential hazard to on-site personnel and off-site persons. The LLNL and DOE emergency classification schemes are defined in Section 1.2. The Hazardous Waste Management Division may respond to a Level 1 incident; the Fire Department will respond to Levels 2, 3, and 4 incidents. To determine if a Level 1 incident has been exceeded, refer to the criteria in Section 1.3.

6.1 LLNL Site-Wide Emergencies

LLNL maintains a Self-Help Program. Each department/division is required to prepare and keep its own Self-Help Plan, designed to collect and safeguard personnel and visitors during site-wide emergencies. Whenever a major emergency event occurs and LLNL's Emergency Response Organization is fully committed, the Self-Help Plans are enacted.

LLNL is divided into multiple Self-Help Zones, each under the direction of a senior manager (Zone Supervisor). Within each zone are designated Assembly Points, where Assembly Point Leaders control the local emergencies while awaiting assistance from the Emergency Response Organization. The highest ranking individual at the Assembly Point is appointed leader. Personnel are instructed to meet at this Assembly Point whenever evacuations are necessary. The Area 612 Facility is located in Self-Help Zone 13. See Section 8 for more specific emergency evacuation instructions.

6.2 Emergency Situations

The following sections describe the procedures for each of several emergency situations.

6.2.1 Fire or Explosion

If a fire or explosion occurs, personnel should:

- Dial ext 911 and give the Emergency Dispatcher the following information:
 - Name
 - Location of the incident (building, room, area, cross streets, or any other information that might help the emergency response personnel quickly locate the scene)
 - Nature of the incident (fire, electrical, chemical, etc.)
 - Additional information that might affect the response personnel (severity of the fire, materials at risk in the immediate area)
- Remain on the phone to verify the information given to the Emergency Dispatcher and receive instructions
- Notify supervisor
- Isolate the emergency area
- Give emergency aid to the injured, if safe to do so
- After performing the above steps, if a fire can be controlled with a fire extinguisher, an employee **trained** in using fire extinguishers **may** attempt to control the fire (see Section 7.3.1).

The Incident Commander (from the LLNL Fire Department) is responsible for controlling the incident as described in Section 4.4.

6.2.2 Earthquakes

The following precautions should be taken during an earthquake:

- Remain calm, think through the consequences of any actions taken, and try to calm and reassure other individuals
- Indoors, watch for falling light fixtures and other objects; if in danger, get under a table or desk in a corner away from the windows, or stand

in a strong doorway; encourage others to follow your example; usually it is best not to run outside

- Do not use the telephone unless you have an emergency; the telephone system, even after a minor earthquake, becomes overloaded with calls making it difficult for people with emergencies to place calls; wait at least 30 minutes before calling home or making non-emergency telephone calls
- If you must leave the building, choose your exit as carefully as possible
- Do not touch downed power lines or objects that are touching downed lines
- Outside, avoid high buildings, walls, power poles, and other objects that could fall; do not run through streets; if possible, move to an open area away from all hazards
- Follow instructions that may be given over the emergency public address system; if you are told to evacuate the building, go to the designated Assembly Point for your area unless directed otherwise (see Section 8).

After a major earthquake, determine if their fellow workers are injured. If instructed to evacuate, go to the Emergency Assembly Point, if conditions are safe in that area. Then follow the instructions of the Assembly Point Leader. He or she will organize a sweep team to accomplish the tasks listed below. If evacuation is not ordered, then find a safe place and stay there until the emergency subsides. Then, if necessary, assist the Area 612 Facility Supervisor or alternate and/or the Facility Coordinator in accomplishing the following tasks:

- Do not move seriously injured persons unless they are in immediate danger of further injury
- Call the Emergency Dispatcher (ext 911) for emergency assistance
- Check for fires or fire hazards, particularly in hazardous, radioactive, and mixed waste storage areas
- Check utility lines and equipment for damage; shut off electrical power to equipment; do not use matches, lighters, or open-flame appliances or operate electrical appliances or switches until you are sure no flammable vapors are present

- Inspect the facility to verify that there has been no damage to tanks, piping systems, containers, or storage areas; the area should be cordoned off to control access
- Stop the source of any releases and provide containment of any released material
- Assist in the cleanup of any released chemicals or other potentially harmful materials as directed in Section 6.2.6
- Report any emergencies to the Emergency Dispatcher.

6.2.3 Power Outages

Routine waste management operations of this facility are conducted during daylight hours (8:00 a.m. to 5:00 p.m.), Monday through Friday, except holidays.

Many of the waste container storage areas (e.g., 612-1, 612-2, 612-4, 612-5) are in the open without lighting systems. Power outage at those storage units would have little or no effect on operations.

A gas-powered portable generator and three floodlights are maintained in the Hazardous Waste Management Division's release response trailer which is located in the Area 612 Facility. This equipment is available for use during nonroutine waste management operations or emergency situations. The portable generator is serviced and tested once a month regardless of use.

One other additional portable generator is maintained with additional floodlights and construction light strings in the Support Services Group equipment yard located north of Building 419. The generator is also tested and serviced once a month regardless of use. The generators, floodlights, and construction string lights are available as needed.

Employees also have access to flashlights to monitor the facility during a power outage. If a power outage were to occur at the same time as an indoor waste release, a portable generator with accompanying flood lights is available for cleanup operations. This equipment is also available for a release detected outdoors (or indoors) at night.

On-line backup power sources are available for portions of the Area 612 Facility. In the case of a power outage, all processes would stop until power is restored. This lack of back-up power does not pose a threat, since none of the operations at the Area 612 Facility require power to prevent a release of hazardous, radioactive, or mixed waste substances. Equipment such as the Building 612 Drum/Container Crushing Unit and equipment used during size reduction operations would simply be shut down as directed by OSP for power outages. The waste feed system for the compactor is manual, so there is no chance for the equipment to automatically feed waste. The Biomed carcass freezer near the

612-2 Container Storage Area has backup power from the Laboratory's emergency system to the east of the 612 Facility.

Upon loss of power, employees should:

- Cease all work in the affected waste handling and processing areas
- Secure all tools, equipment, and systems in accordance with OSPs, and leave them in an appropriate state for restoration of regular power (manually shut down the Building 612 Drum/Container Crushing Unit)
- Leave the affected area, observing proper exit procedures (e.g., proper removal of protective clothing and protective equipment)
- Report to supervisor for instructions.

6.2.4 Container Failure

If a container holding hazardous, radioactive, or mixed waste or material releases, leaks, or otherwise releases its contents to the environment and if there is no immediate threat to personnel safety, Hazardous Waste Management Division personnel will take immediate action to contain the release. They will follow the procedures outlined in this section as well as Section 6.2.6.

6.2.4.1 Procedures to Stop and Contain Waste

When visual monitoring indicates that a leak or release has occurred, a series of steps must be taken to evaluate the situation. These steps are structured to provide the appropriate actions to (1) minimize the environmental impact and (2) determine a course of action to remedy the problem.

The following actions are required when a leak is detected:

- Cease waste handling operations
- Isolate or remove any containers of incompatible wastes from release vicinity if contact is possible
- Initiate release response in accordance with Section 6.2.6
- Use Drum Repair Kit for temporary drum repair, in accordance with Section 6.2.6.1 (Step 2)
- Place the damaged container into a compatible overpack drum or other suitable container when conditions are safe.

6.2.4.2 Removal of Waste

Liquid within secondary containment is removed in a timely manner. Large releases are pumped into appropriate containers and small releases are treated with absorbent material that is placed into appropriate containers. All liquids contained in the basins, including rain and rinse water, are collected, then sampled and analyzed. These accumulated liquids are discharged to the sanitary sewer if the analytical results show contaminant concentrations below established discharge limits and a signed sewer release authorization is issued. If the liquids do not meet discharge criteria, they are either treated at the Area 514 Facility or shipped off-site to a permitted treatment, storage, and disposal facility.

6.2.5 Equipment Failure

Procedures have been developed to manage situations in which equipment failure may cause a release of hazardous, radioactive, or mixed waste or materials. These pertain mostly to forklifts and cranes that handle containerized loads. The Area 612 Facility treatment units (Building 612 Drum/Container Crushing Units and the Building 612 Size Reduction Unit) process only solid wastes. If the Building 612 Drum/Container Crushing Unit fails, or an operational failure takes place during size reduction activities, equipment is immediately shut off, and operations are not resumed until repairs are made.

6.2.5.1 Action Required to Stop and Contain Waste

When visual monitoring indicates that a leak or release has occurred, a series of steps must be taken to evaluate the situation. These steps are structured to provide the appropriate actions to (1) minimize the environmental, safety, and health impact and (2) determine a course of action to remedy the problem. The following actions are required after a leak caused by equipment failure is detected:

- Cease operation of the equipment
- Isolate or remove any containers of incompatible wastes from release vicinity if contact is possible
- Initiate release response in accordance with Section 6.2.6
- Remove the waste from the system and/or secondary containment as described in Section 6.2.4.2
- Locate the leak
- Decontaminate the equipment
- Repair or scrap equipment (initiate closure proceedings for scrapped permitted equipment).

6.2.5.2 Repairs

Equipment may be returned to service after the waste is removed and repairs, if necessary, are completed.

6.2.6 Release Response for Hazardous Materials and Waste

Releases from Level 1 incidents are called “small incidents.” These releases may be cleaned up by Hazardous Waste Management Division personnel without notifying the LLNL Fire Department. Response procedures for Level 1 incidents are included in this document to provide guidance for Hazardous Waste Management personnel. This Contingency Plan is not considered to be implemented for Level 1 incident mitigation. Releases from Level 2, 3, and 4 incidents are called “large incidents” and must be mitigated by the LLNL Fire Department. To determine if a release is considered a small incident, the following criteria must be met:

1. The identity of the released material or waste is known
2. The released material or waste is commonly handled by Hazardous Waste Management Division, and the personnel are familiar with its hazards
3. The release can be contained and controlled or cleaned up by two people in less than one hour.

The Area 612 Facility Supervisor or alternate will make this determination. He or she may consult with the Hazards Control ES&H Team for help with this assessment. In case of a radioactive or mixed waste release, the Hazards Control Safety Team is called to monitor the radioactivity levels.

If personnel have any doubt about their ability to clean up a release properly and safely, the LLNL Fire Department should be notified immediately.

6.2.6.1 Ten-Step Release Response Guidance Plan

A ten-step approach is followed to manage leaks and releases of hazardous, toxic, radioactive, or mixed materials and wastes. This approach is illustrated below:

Ten-Step Approach to Managing Leaks and Releases of Hazardous Materials and Wastes



Identify the spill



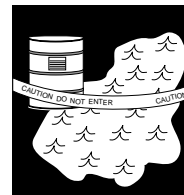
If safe, shut off the source



Eliminate ignition sources

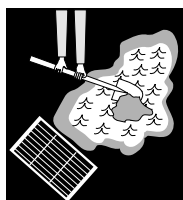


Contact your supervisor

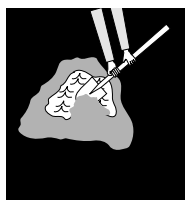


Cordon off the area

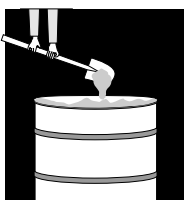
If the release is manageable, continue with Steps 6–10. If not, call the LLNL Fire Department on ext 911; if any of the above steps are not considered safe, then immediately call the Fire Department.



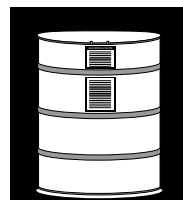
Contain



Absorb and neutralize



Clean up



Dispose of as hazardous waste



Decontaminate and restock spill equipment

Note: Depending on the type of release, proper decontamination procedures and equipment requirements need to be established. A decontamination zone will help ensure that wastes from this activity is properly collected. If direct contact with a hazardous or toxic waste or chemical arises from any release-response actions, personnel should do the following:

- Use eyewash or shower
- Remove contaminated clothing
- Use soap and water to scrub off contaminant.

More detailed descriptions of each step are as follows:

1. Identify the release

- Stand upwind of the released substance
- Identify wastes by information on the container labels: hazardous waste by the red/white label; radioactive waste by the yellow/white

label; PCBs by the black/yellow label; and mixed waste by the red/yellow label

- Identify wastes also by information on the Waste Disposal Requisition form
- Do not remain in the area if an immediate personnel hazard exists
- If the label cannot be read and the material cannot be positively identified, call the LLNL Fire Department on ext 911 for assistance. Cordon off the area affected by the release until the Fire Department arrives.

2. Shut off the source of release

- If waste type is known and no major hazards exist, do the following:
 - Wear PPE sufficient to protect against the material or waste released (see Appendix A for guidelines or contact Hazards Control ES&H Team)
 - Shut off the source of the release immediately or place the container in an upright position. Each Emergency Spill Kit contains a Drum Repair Kit; use the repair kit to temporarily plug holes or small tears in the container until the waste can be overpacked into a larger container. Prompt action can prevent a small release from becoming a large one.

3. Eliminate ignition sources

- Wiring and breakers
- Exhaust systems
- Generators and pumps

All sources of spark or flame in the area should be extinguished. In addition, all containers of waste incompatible with released materials should be moved away from the vicinity of the release if contact is possible.

4. Contact your supervisor. Report the release to the supervisor as soon as possible. Depending on the magnitude of the release, the following people should be notified:

- Supervisor
 - All releases
- Health and Safety Technician

- All releases
 - Environmental Analyst
 - All releases
 - LLNL Fire Department
 - Any release that cannot be safely cleaned up by Hazardous Waste Management Division.
5. Cordon off the area (this step provides instructions for the Area 612 Facility Supervisor or alternate)
- If the release is manageable, evacuate all persons from the area that are not involved in cleanup operations. Make sure no unauthorized personnel enter the release area. At this point call the Hazards Control ES&H Team if advice is needed regarding the type of PPE or containment equipment to use
 - Have the release area cordoned off (put up a barricade with tape or rope)
 - If the release is too large for Hazardous Waste Management Division personnel to manage, call the LLNL Fire Department (ext 911). Evacuate all persons from the release area. Prevent all entry to the release area until the LLNL Fire Department arrives.
6. Contain the release
- Wear personal protective equipment adequate to protect against exposure or contact with the released material or waste. Protective clothing can be found in the nearest Emergency Spill Kits. Additional personal protective equipment can be found in the nearest PPE locker. See Figures 7-1 through 7-8 in Section 7 for Spill Kit and PPE locker locations. Appendix A provides general guidelines for choosing PPE. For further assistance, contact the Hazards Control ES&H Team
 - Use the appropriate equipment from the nearest Emergency Spill Kit to contain and absorb the released material or waste (see Appendix B). Contact the Hazards Control ES&H Team for additional assistance.

Containment Techniques for all Liquid Waste releases

- If the release can safely be cleaned up by Hazardous Waste Management Division personnel, efforts should be made to keep the release from spreading. Containment is possible by damming,

diking, or blocking the path of the release. Absorbent material can be spread immediately around the release area

- Choose an absorbent material that is compatible with the released material or waste
- Use absorbent socks (or “Pigs”) or loose absorbent to dam up waste, beginning at its point of most rapid flow and on sides where release flows toward drains or other conduits to the environment.

Techniques to Protect Drains

- Use absorbent socks, or loose absorbent material to encircle the entire drain to prevent the waste from entering
- Add a second outside ring if absorbent material appears saturated
- Protect floor drains, storm drains, and any other conduits to the environment, by surrounding them with an absorbent dike.

7. Absorb or neutralize

- Cover the contained release with loose, compatible absorbent material, working from the perimeter inward toward the center
- If neutralization of corrosive releases is desired, then an appropriate neutralizing absorbent may be substituted
- Small releases may be absorbed solely with an absorbent sock. See Appendix C for more details regarding procedures for absorbing and/or neutralizing releases of acid, aqueous, caustic, flammable liquid, polychlorinated biphenyl (PCB), or oxidizer materials or wastes.

8. Cleanup

- Use appropriate waste disposal containers
- Once the release has been contained and absorbed, properly clean up the spent absorbent and cleanup materials. Used absorbent, clothing, and cleanup supplies that cannot be properly decontaminated must be disposed of as hazardous, radioactive or mixed waste, as applicable. Drums or other appropriate containers may be used to contain spent absorbent. Appropriate waste labels must be used to identify waste containers. Release-response supplies that have been used in the release response must be replaced before Area 612 Facility operations resume

- Swipe samples of the release area will be taken and analyzed to verify the adequacy of cleaning effort, based on regulatory thresholds for hazardous waste classification

9. Disposal of hazardous waste

- Use existing Hazardous Waste Management Division procedures
- Evaluate all materials used in the release response to determine whether they must be managed as hazardous, radioactive or mixed waste. All regulated waste must be handled according to Hazardous Waste Management Division procedures
- Complete the appropriate waste label and attach to the container
- Initiate the Waste Disposal Requisition process.

10. Decontaminate and restock

- Establish a decontamination zone for personnel, if warranted
- Remember: Handle rinse water from decontamination operations as a hazardous, radioactive, or mixed waste, pending analysis (see 6.3.1)
- Before resuming operations, restock supplies and decontaminate equipment and personal protective equipment, if they are intended for future use. If disposable, discard in accordance with all applicable regulations

6.3 Decontamination

6.3.1 Hazardous Waste Management Division Decontamination Activities for a Small (Level 1) Incident

All equipment, protective clothing, and other materials used in release response are evaluated to determine whether they are contaminated with hazardous, radioactive, or mixed wastes. All nondisposable items are decontaminated. Any rinse water generated from decontamination operations is managed as hazardous, radioactive, or mixed waste, pending analysis. If test results indicate the rinse water is a hazardous, radioactive, or mixed waste, then it is either treated at the Area 514 Waste Water Treatment Tank Farm Unit or containerized for shipment to a permitted treatment and disposal facility. These accumulated liquids are discharged to the sanitary sewer if analytical results show contaminant concentrations below established discharge limits and a signed sewer release authorization is issued by the Wastewater Guidance and Monitoring Group. All disposable items are handled as hazardous, toxic, radioactive, or mixed waste unless test results indicate otherwise. Swipe samples are taken of the affected area and equipment. Analytical results

from swipes and rinse water are used to verify whether decontamination procedures are complete, based on regulatory thresholds for hazardous waste classification.

All hazardous, radioactive, and mixed wastes are properly packaged and labeled. A waste disposal requisition form is completed and processed for each container. Spill kits and PPE lockers are then restocked.

6.3.2 LLNL Fire Department Decontamination Activities for Large (Levels 2, 3, and 4) Incidents

The LLNL Fire Department manages all decontamination efforts following large incidents. Their decontamination procedures are discussed in the *LLNL Fire Department Policies and Procedures* (Volume 1), under Tactical Plan 1607 (LLNL, 1987).

6.4 **Internal Notification**

In the event of a large hazardous, radioactive, or mixed waste release (Level 2, 3, or 4 incident), fire, or other emergency, the observing Supervisor or designee immediately notifies the Emergency Dispatcher by dialing ext 911 on the nearest available telephone. For cellular phones, the emergency number is 422-7595. If necessary, the Facility Operations Supervisor or alternate will initiate evacuation procedures of facility personnel (see Section 8 for more details). If any questions exist as to the magnitude of the emergency and whether or not it should be called in, the Area 612 Facility Supervisor or alternate should call the Hazards Control ES&H Team to help with the assessment.

If the decision is made to call the LLNL Fire Department, dial ext 911. The caller should remain on the line to verify that the dispatcher has the correct information and receive instructions. Once notified, the Emergency Dispatcher relays the information promptly over dedicated telephone lines to the response groups that need to respond immediately. After this is completed, the Dispatcher uses the best available method for notifying other personnel that are requested. This is normally accomplished using a radio page for key individuals. During off-shift hours, key personnel are notified by telephone or radio page. Response personnel are available on a 24-hour basis.

6.5 **External Notification**

Off-site agencies are notified, according to the emergency classification or the need for support. Information is provided by using standardized formats as much as possible, as described in the *LLNL Draft Emergency Plan*. The Emergency Dispatcher, under the direction of the Incident Commander, makes the initial notifications. The Department of Energy Oakland Operations Office; the City of Livermore; Alameda County; and appropriate State agencies will be notified and kept informed throughout the emergency. Additionally, if an alert involves a security threat, the Federal Bureau of Investigation is notified.

If the Incident Commander or designee determines that the release, fire, or explosion could threaten human health or the environment or otherwise cause the

implementation of this Contingency Plan, the Incident Commander reports that finding as discussed in Section 9.2.

7. EMERGENCY EQUIPMENT

This section briefly describes the emergency equipment located at the Area 612 Facility. This equipment includes the internal and external communication systems, fire suppression system, the water supply, the emergency response and release control equipment, MSDSs, the emergency lighting systems, and the decontamination equipment. Pertinent emergency equipment is listed in Appendix D with location(s), a basic physical description, and a brief statement of capabilities for each item.

7.1 Internal Communication System

Telephones are located throughout the Area 612 Facility (see Figures 7-1 to 7-8). During emergencies, these telephones can be used to notify the Area 612 Facility supervisor or an alternate, the LLNL Emergency Dispatcher, and other key personnel. These individuals can help summon additional responders and/or initiate evacuation procedures. In addition, the Area 612 Facility paging system can be accessed by dialing # 133 on a touch-tone telephone. This paging system can be used to simultaneously alert all Area 612 Facility personnel.

Several mobile telephones are available to HWM personnel. These may be used in emergencies. HWM also has several hand held portable communication radios available for emergencies.

Fire and incident alarm pull stations are also at several locations in the Area 612 Facility (see Figures 7-1 through 7-7). The incident alarm, a silent alarm, allows the Area 612 Facility Supervisor (or alternate) to notify the Fire Department without using a 'phone.

In addition, all Hazardous Waste Management Division Operations personnel wear radio pagers. During an emergency, they can all be paged as a group. The "Group 3" code will be shown on their pager, in addition to the telephone extension to call for instructions. The Area 612 Facility Supervisor, his or her alternate, the Hazardous Waste Management Division receptionist, or Hazardous Waste Management Division management can activate this system.

7.2 External Communication System

The LLNL Fire Department is notified of an incident at the Area 612 Facility in one of several ways: through the Emergency Dispatcher, who is summoned by dialing ext 911 on any telephone; by the automatic sprinkler fire suppression systems in Buildings 612 and 625, which includes alarms which are activated at the Emergency Dispatch Center whenever water flows through the sprinkler lines; and by any of the fire or incident alarms, that (when pulled) activate an alarm at the Emergency Dispatch Center. (Smoke detectors in the office areas of Trailers 6178 and 6179 are of the "no-pull" variety.) There is a pull station in the hall between trailers 6178 and 6179 and at the front door of 6179.

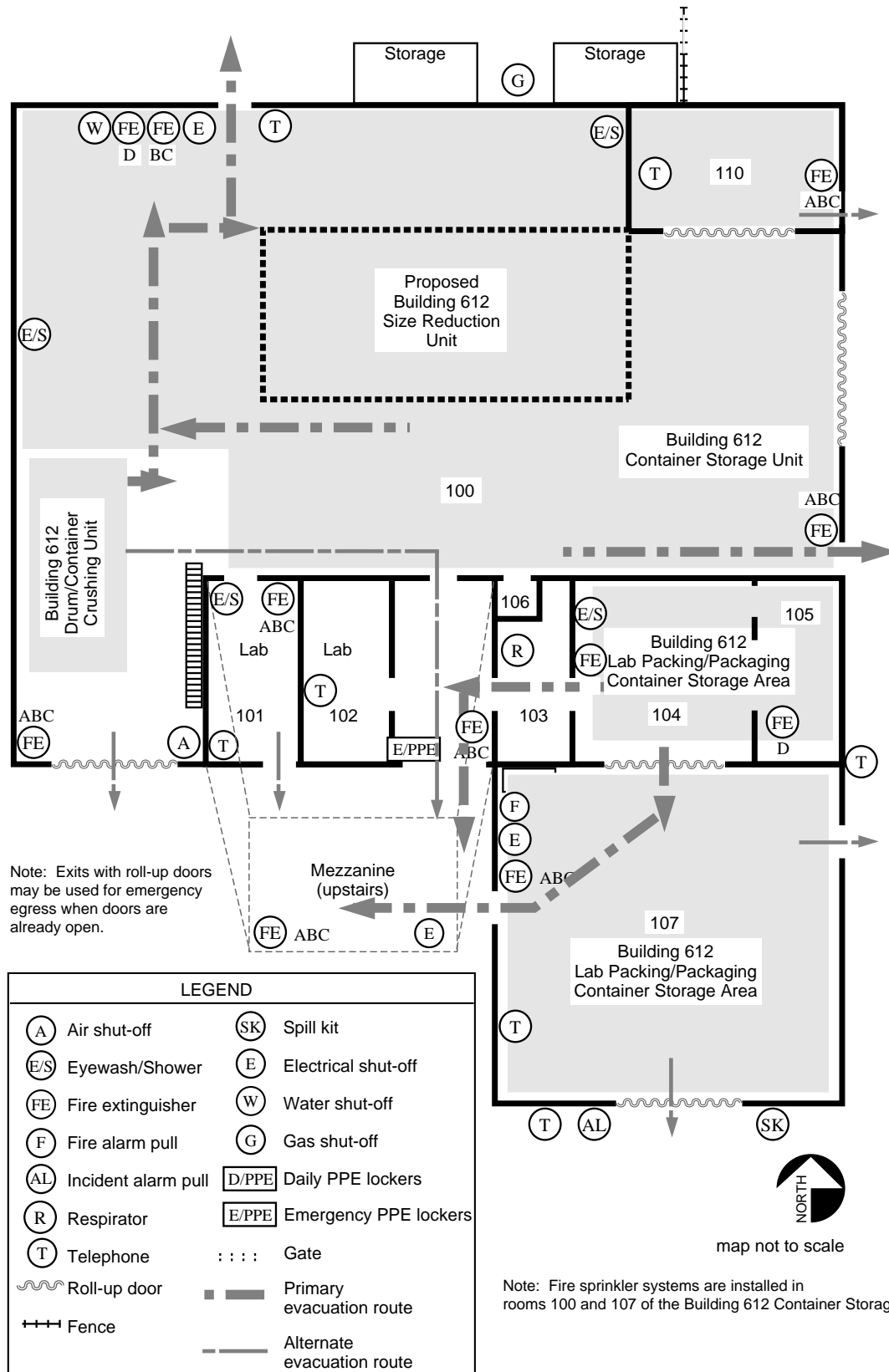


Figure 7-1. Area 612 Evacuation Routes and Emergency and Safety Equipment

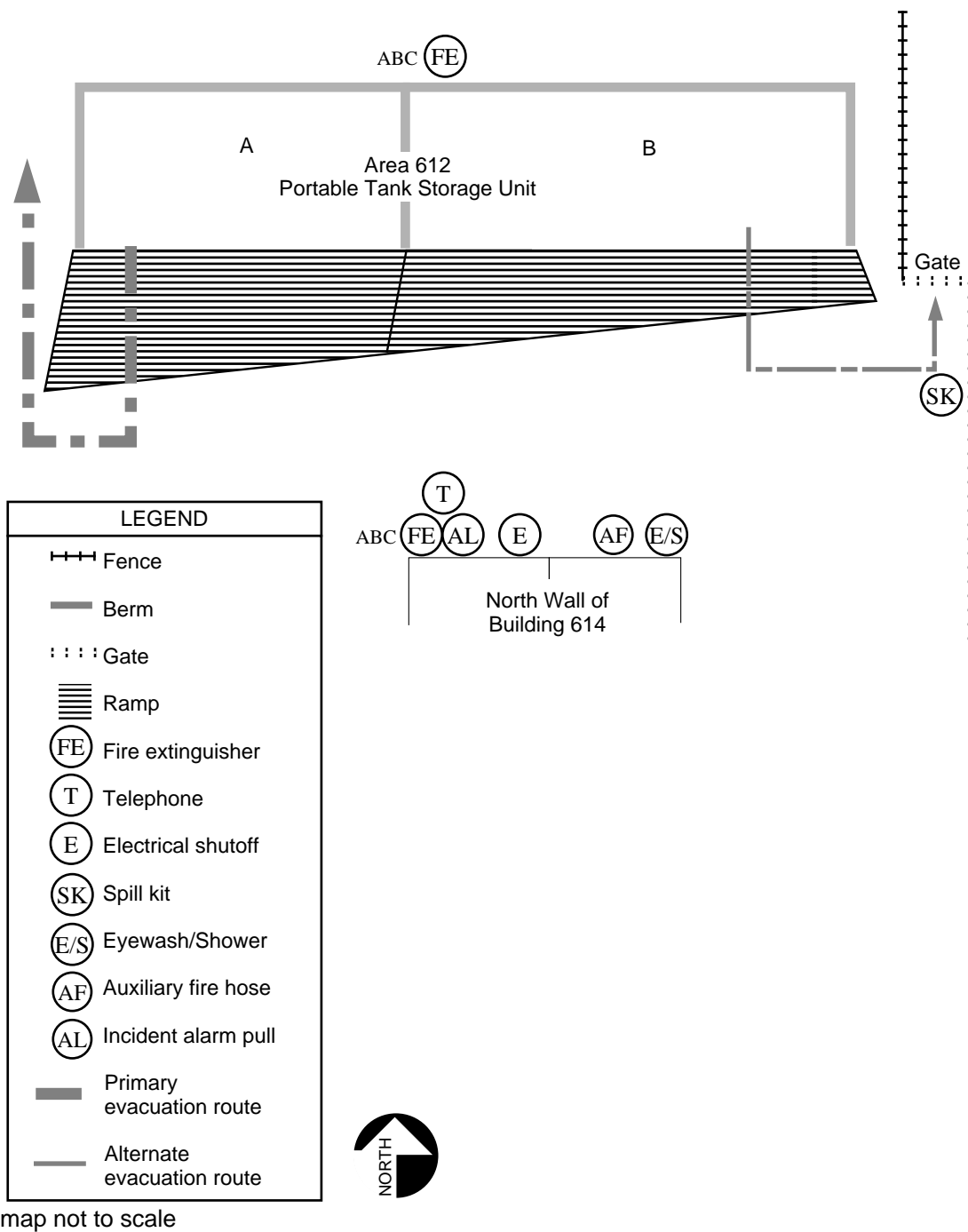


Figure 7-2. Area 612 Evacuation Routes and Portable Tank Storage Unit Emergency and Safety Equipment

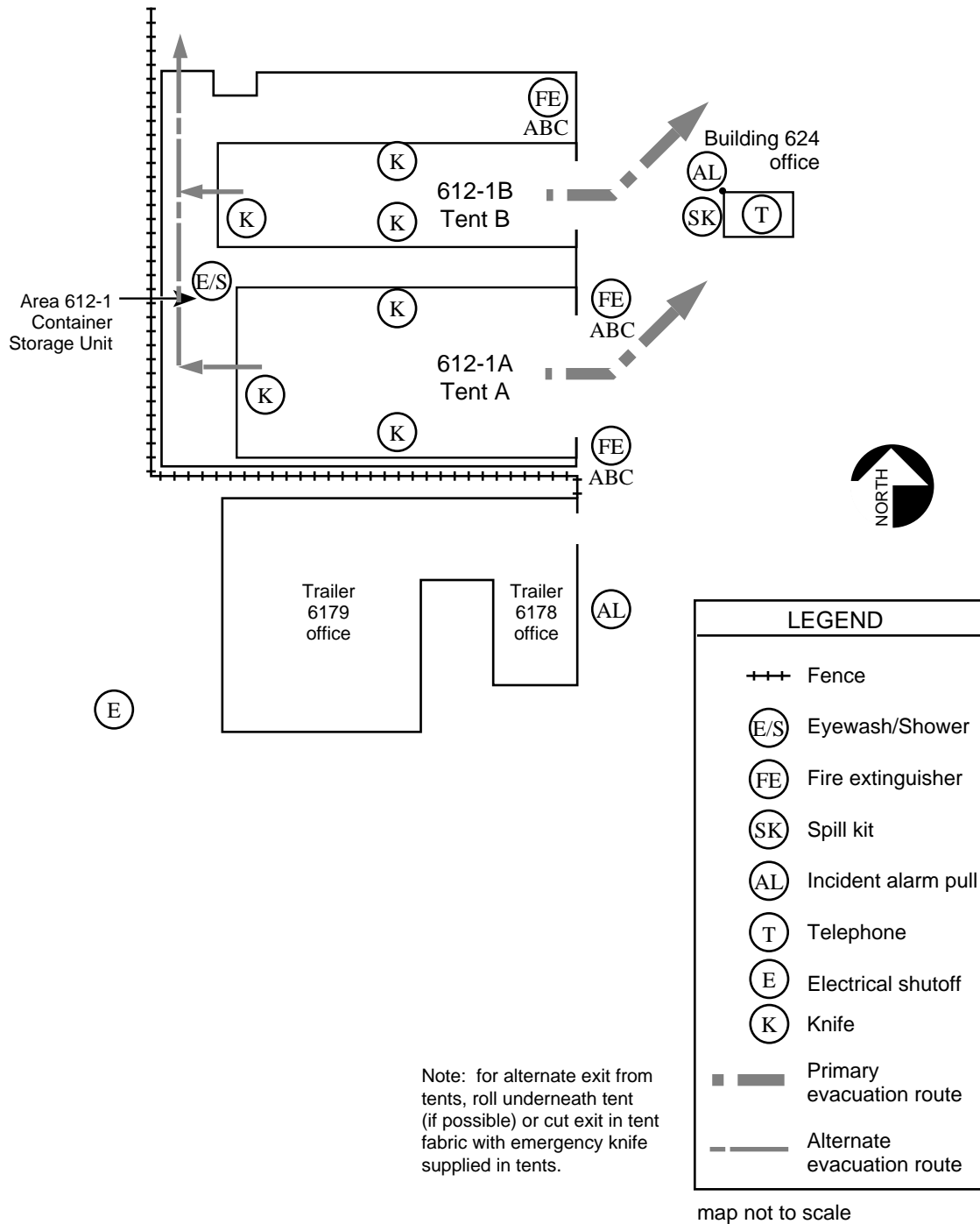


Figure 7-3. Area 612-1 Evacuation Routes and Container Storage Unit Emergency and Safety Equipment

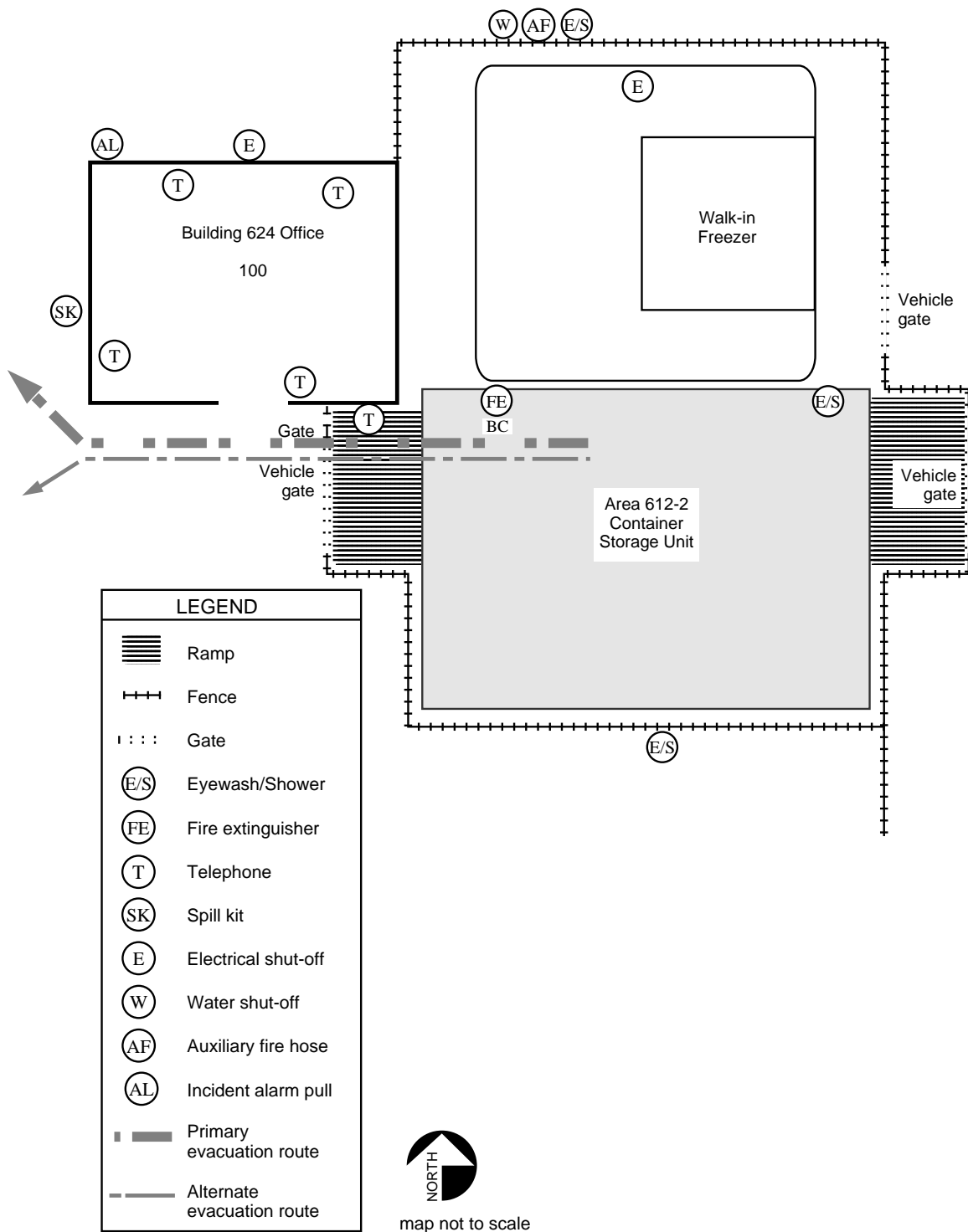


Figure 7-4. Area 612-2 Evacuation Routes and Container Storage Unit Emergency and Safety Equipment

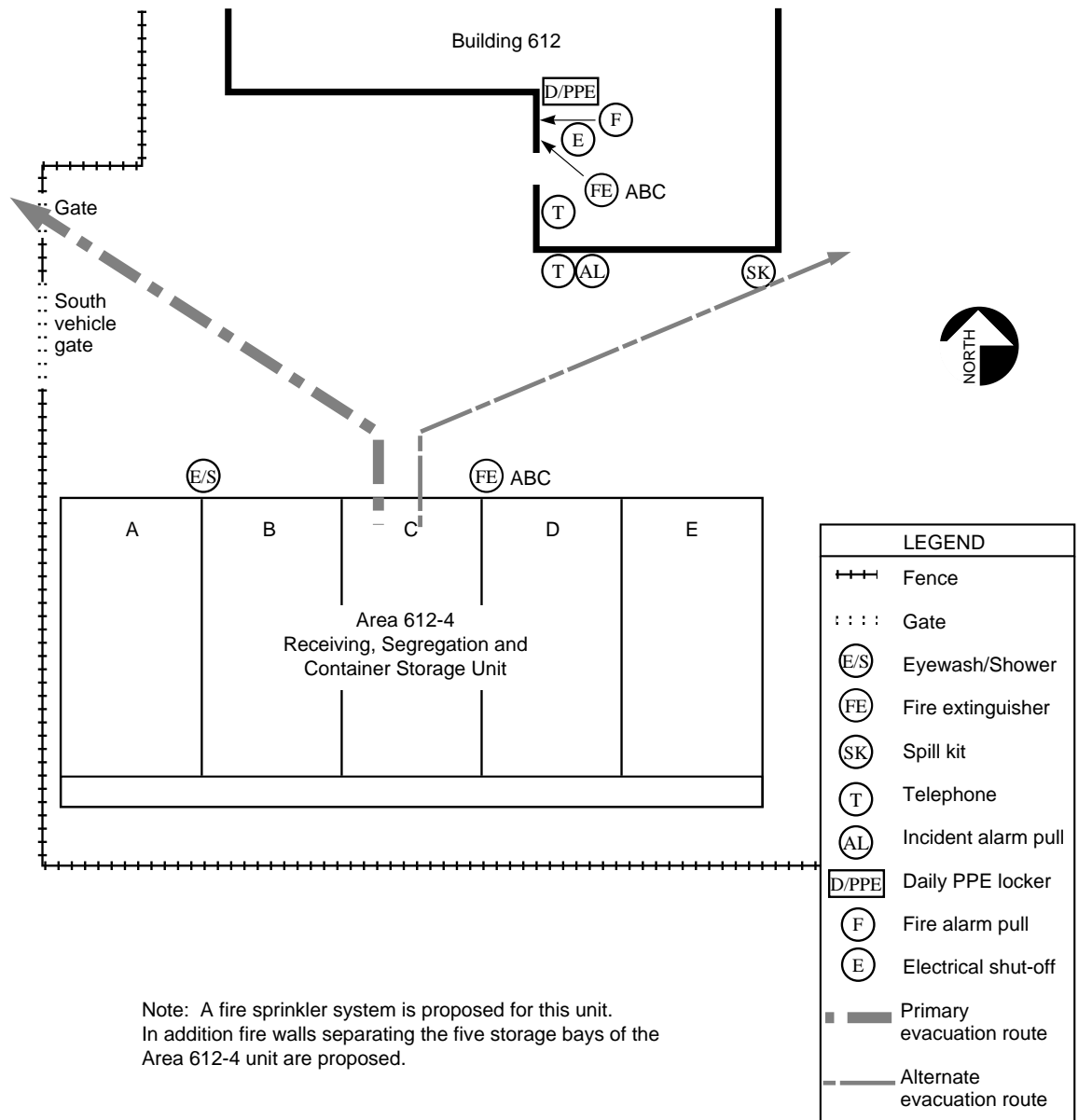


Figure 7-5. Area 612-4 Evacuation Routes and Receiving, Segregation, and Container Storage Unit Emergency and Safety Equipment

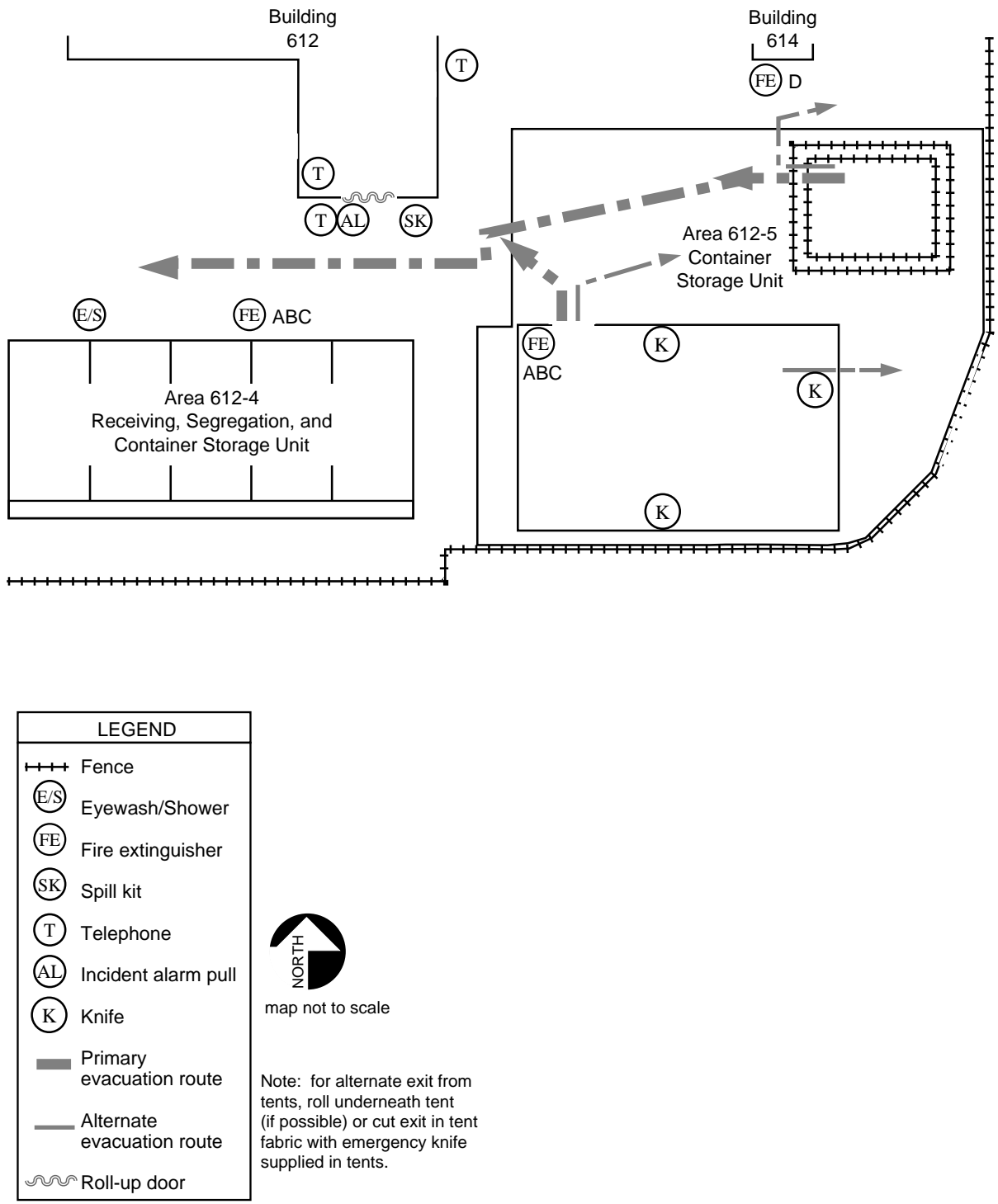


Figure 7-6. Area 612-5 Evacuation Routes and Container Storage Unit Emergency and Safety Equipment

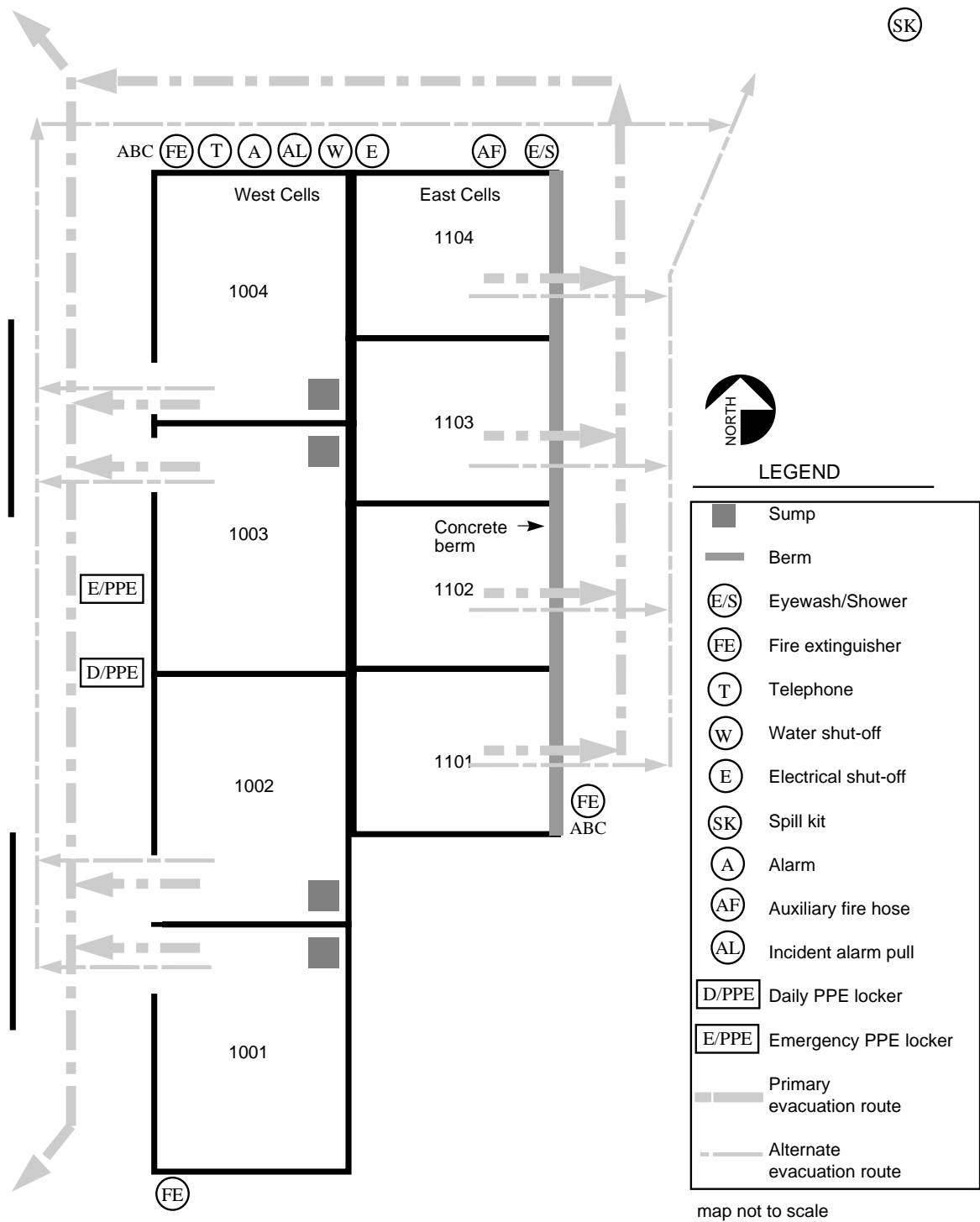


Figure 7-7. West and East Cells Evacuation Routes and Container Storage Units Emergency and Safety Equipment

The Emergency Dispatcher alerts the LLNL Fire Department emergency responders and may warn personnel over the site-wide public address system of any dangers and necessary precautions, and may also provide evacuation instructions. For localized emergencies, this public address system can be used to selectively warn Area 612 Facility personnel and on-site neighbors.

7.3 Fire Suppression System

Automatic-sprinkler wet-pipe fire-suppression systems are installed in Building 612, rooms 100 and 107, and Building 625 in accordance with the National Fire Protection Association (NFPA) Standard 13, the standard for the installation of sprinkler systems. The fixed pipe automatic sprinkler system in each building is equipped with ordinary temperature heads containing fusible links designed to melt between 135°F and 212°F, causing the sprinkler line to open and spray water over the fire. The action of the water flowing through the sprinkler line activates an alarm at the Emergency Dispatch Center. The Emergency Dispatch Center will notify the LLNL Fire Department, which will respond to the alarm. Sprinkler heads are installed a maximum of 12-in. from the ceiling. Testing (performance, verification) on the sprinkler system is performed quarterly and according to a published schedule. The type of sprinkler heads, temperature of the heads, and location of the heads may change as necessary to improve the level of fire protection.

To ensure that sprinkler systems operate properly, employees and supervisors observe the following rules:

- Enclose sprinkler heads in protective cages wherever mechanical damage may be likely
- Keep normal and maintenance-type heat sources (i.e., torches or soldering irons) away from sprinkler heads
- Keep furniture, equipment, and other materials away from sprinkler heads to ensure that they do not interfere with the water-spray pattern
- Allow an 18-in. clearance below sprinkler heads
- Prohibit climbing on pipes or placing ladders against sprinkler pipes or heads
- Provide at least a 3-ft clearance around sprinkler-control valves to allow fire-safety personnel access to them
- Operations in Building 612 and/or Building 625 shall cease if fire protection is not operating or is not available.

The Area 612-4 Receiving, Segregation, and Container Storage Unit will be upgraded in 1995 or 1996 to incorporate a higher fire protection rating. The upgrade includes the following: a new secondary containment system with double-walled trench drainpipe and underground, double-walled tank; one-hour fire-rated side walls between cells and on the east and west exterior sides of the unit; and a dry-pipe fire sprinkler system. The fire detection and alarm system will detect the presence of heat in the cell, automatically start

the sprinklers in the particular cell, and alert the LLNL Fire Department. The sprinkler system will be in compliance with National Fire Protection Association (NFPA) Standard 13, the standard for the installation of sprinkler systems. The type of sprinkler heads, temperature of the heads, and location of the heads may change as necessary to improve the level of fire protection.

Sprinkler heads will be installed in each cell at a maximum of 12 inches from the ceiling. The dry-pendent sprinklers will contain a fusible link. Upon fusing, air pressure causes the levers and link part to be ejected; the inner tube drops; and water is allowed to flow through and out the sprinkler head. The water hits a deflector on the sprinkler head and is distributed in a spray pattern comparable to a 1/2-inch standard sprinkler. The action of the water flowing through the sprinkler line activates an alarm at the Emergency Dispatch Center and response by the LLNL Fire Department.

Tent fabric, which encloses the Area 612-5 and 612-1 Container Storage Units, is polyvinyl chloride (PVC)-coated polyester, which is rated as SF852-flame retardant fabric by the California State Fire Marshal.

7.3.1 Fire Extinguishers

Fire extinguishers are manually operated, portable devices that will discharge an extinguishing agent when properly activated. They are used to control a fire during the time between discovery and arrival of the LLNL Fire Department. They are located throughout the Area 612 Facility, and additional fire extinguishers are located in areas of specific fire hazards. The locations and types of fire extinguishers in the Area 612 Facility are shown in Figures 7-1 through 7-8. All Hazardous Waste Management Division personnel actively engaged in operations involving hazardous waste are trained in the use of fire extinguishers. Only trained personnel are instructed to use fire extinguishers. Fire extinguishers are used to control small fires during the time between discovery and arrival of the LLNL Fire Department.

Type A extinguishers are used to control fires starting from ordinary combustibles (i.e., paper or wood) and usually contain water.

Type ABC extinguishers are used to control fires starting from either ordinary combustibles, flammable liquids, or electrical and usually contain monammonium phosphate.

Type BC extinguishers are used to control fires starting from either flammable liquids or electrical and usually contain Purple K Powder (potassium bicarbonate), sodium bicarbonate, CO₂, or Halon.

Type D (metal-x) extinguishers are used to control fires starting from flammable metals (i.e., magnesium) and usually contain sodium chloride.

7.3.2 Water Supply

Water supply for all purposes, including emergency response, is provided to the Area 612 Facility as a part of the site-wide utility infrastructure under the administration of LLNL Plant Engineering Department. Potable water from the Hetch Hetchy system is delivered under gravity flow via a 6.1-mile-long pipeline to three water storage tanks located on a hill at the south end of the Sandia National Laboratories site. If for some reason this water supply is cut off from the Hetch Hetchy source (i.e., pipeline rupture, earthquake, etc.), water supply to the storage tanks can be restored through a backup tie-in to the Zone 7 Water District.

The storage tanks have a combined capacity of 1,280,000 gal. Water is delivered from these tanks to the piping grid underneath the LLNL and Sandia National Laboratories sites via a 10-in. pipeline and a 16-in. pipeline. Water pressure in the piping grid varies from 90 psi on the south to 105 psi on the north.

The Area 612 Facility is served by water lines that are used for operations and drinking water, eyewashes, etc. Potable water is supplied to Building 614, and several hose bibs are located in the yard for general housekeeping purposes. These hose bibs are fitted with screw-on backflow prevention devices. Water is also supplied to the sprinkler systems in Buildings 612 and 625.

In the event of unrestrained water flow from damaged or ruptured utilities in the Area 612 Facility, Hazardous Waste Management Facility Operations Technicians assigned to the Area 612 Facility are cognizant of all utility shut-offs, including water, within the facility. The locations of utility shut-offs are shown in Figures 7-1, 7-4, 7-7, and 7-8.

In the event of unrestrained water flow from damaged or ruptured utilities outside of the Area 612 Facility, the LLNL Fire Department and emergency service Plant Engineering Department personnel are available to shut off flow to the incident area.

Within the vicinity of the Area 612 Facility two fire hydrants (Nos. 621 and 622) can be used for emergency response. These hydrants are located in the Area 612 Facility, as shown on Figure 7-9. The volumetric flow rate for fire hydrants in this area is 1,110 gal per minute. The static pressure is 67 psi and residual pressure is 56 psi. The water supply for manual fire fighting can be obtained from either of the two hydrants.

The Area 612 Facility has two water hookups fitted with a 1.5-in. flexible hose that is compatible with standard fire hose connections. These hoses are used for standard operating practices but could be used as backup fire hoses, if necessary. They are located as indicated in Figures 7-4 and 7-7.

7.4 **Response Equipment**

Several categories of emergency response equipment are available at LLNL. This includes release response equipment, response vehicles and heavy equipment, site safety equipment, PPE, emergency assembly point kits, and MSDSs.

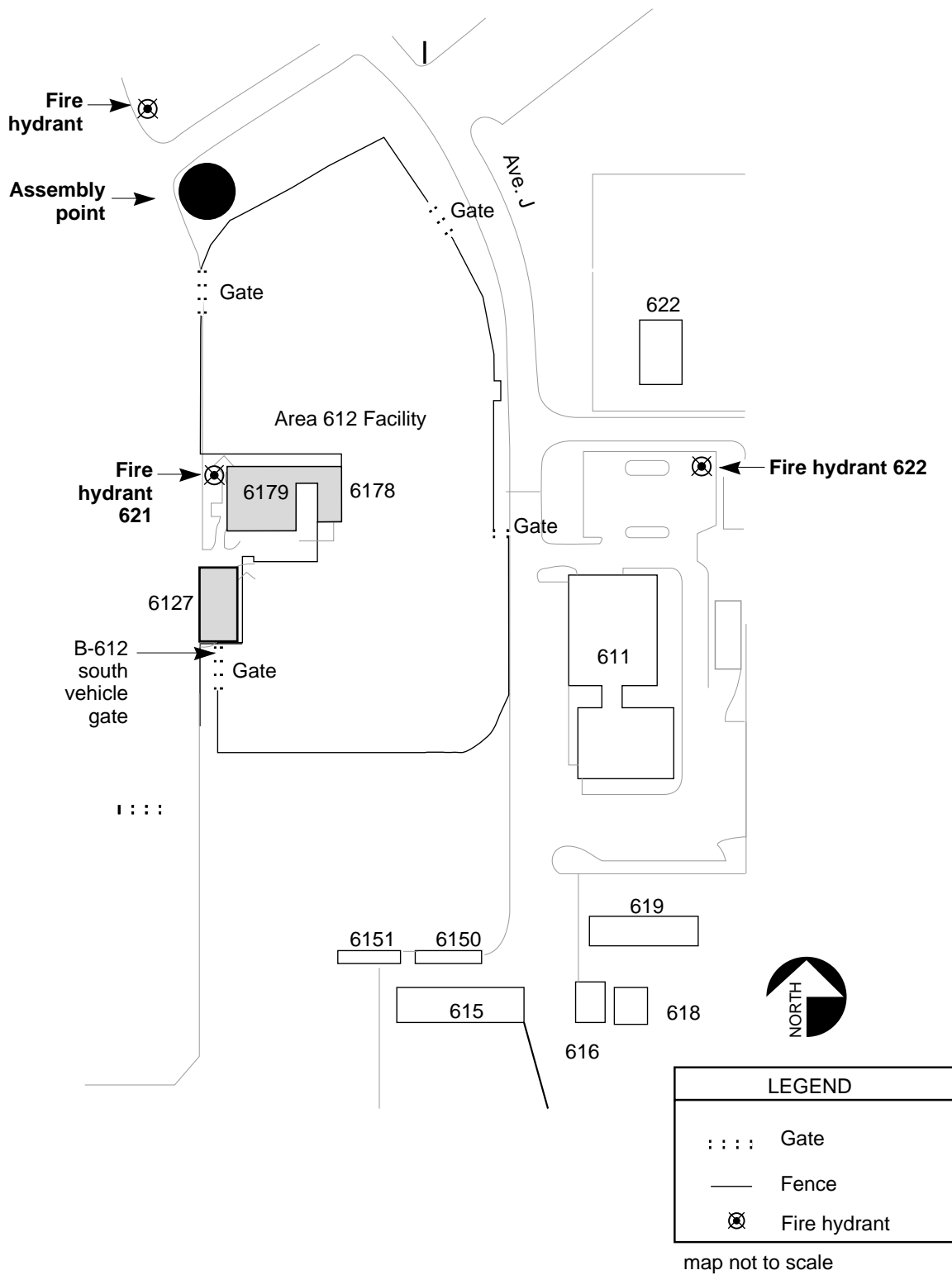


Figure 7-9. Area 612 Facility Fire Hydrant Locations

7.4.1 Release-Response Equipment

For small (Level 1) incidents, Hazardous Waste Management Division has access to the contents of emergency spill kits in several key locations at the Area 612 Facility (see Figures 7-1 through 7-8). These kits contain all necessary equipment needed to contain a small release. Appendix E provides a complete spill kit inventory and the capabilities and limitations of each item.

Hazardous Waste Management Division also maintains a release-response trailer containing bulk quantities of release-response equipment that are used to support the Fire Department when mitigating releases from Level 2, 3, and 4 incidents.

For large (Level 2, 3, and 4) incidents, the LLNL Fire Department maintains or has access to a mobile supply of equipment required to mitigate diverse emergencies. The Special Services Unit 1 (at Fire Station 1, Building 323) is a hazardous materials response vehicle operated by the LLNL Fire Department. It contains spill kits, absorbents, acid suits, encapsulating hazardous materials suits, self-contained breathing apparatus, test kits, and hazardous materials reference information.

7.4.2 Response Vehicles and Heavy Equipment

In case of a fire, explosion, or large release of hazardous waste, fire fighting equipment, containment, and emergency equipment is available for use. All LLNL Fire Department vehicles are equipped with radios on LLNL channels, Tri-Valley Mutual Aid channels, and the State Mutual Aid channel. Fire Station 1 (Building 323) contains one pumper, one fire truck, two four-wheel drive command vehicles, two auxiliary pumpers, one primary and one reserve ambulance, a crash truck, and the Special Services Unit 1 for hazardous materials response. Fire Station 2 (Building 870) contains one pumper, one wild land/minipumper, and one ambulance.

The LLNL Fire Department can respond within minutes to a medical emergency with an ambulance. Patients are taken to the LLNL medical clinic which is located near the east gate of the LLNL main site, or for severe accidents, are taken to Valley Memorial Hospital in Livermore or another hospital as specified by the Alameda County Emergency Services district representative.

A variety of heavy equipment is available from Plant Engineering during an emergency. This equipment includes but is not limited to compressors, cranes, cutting torches, forklifts, generators, pumps, scrapers, and bulldozers.

All emergency equipment is maintained on a regular basis to ensure that it is operational at all times. The water trucks are kept full of fuel and water for preparedness. Preventative maintenance checks are performed by the Automotive Fleet maintenance crew according to the recommended factory schedule. Emergency equipment belonging to the LLNL Fire Department and Plant Engineering is listed in Part VIII of the Part B permit application.

7.4.3 Site Safety Equipment

Eyewash stations, showers, and fire extinguishers are located throughout the Area 612 Facility as shown in Figures 7-1 through 7-8.

7.4.4 Personal Protective Equipment (PPE)

Safety glasses and solid-toe safety shoes are required to be worn at all times when working in waste management operational areas. Booties are worn over shoes for certain activities, such as decontamination, or in designated areas where radioactive containers are opened. Coveralls or equivalent are required to be worn at all times by operators handling waste containers. Leather, acid-, base-, or solvent-resistant gloves are worn as appropriate for the waste handling activity. Face shields, goggles, or other facial and eye protection is required to be worn in accordance with the FSPs and OSPs when handling open containers of liquid waste. The level of PPE is assigned based upon the activity (see Section 3.3.2).

Protective clothing for normal daily operations is maintained in one of three PPE lockers located in various portions of the Area 612 Facility (see Figures 7-1 through 7-8). Although clothing in these PPE lockers is intended for protection during routine waste handling operations, contents may be accessed during emergency response procedures to supplement protective clothing stored in the emergency spill kits. The daily and emergency PPE lockers are restocked on a weekly basis and contain the following items:

- Assorted gloves (cotton, leather, neoprene, Viton, exam, and Nitrile)
- Booties,
- Coveralls, anticontaminant (Tyvek® or equivalent), disposable
- Ear plugs
- Goggles, fogless clear.
- Headgear, face shields, and face shield windows
- Lab aprons (chemically resistant)

Two self-contained breathing apparatus (SCBA) units are available at the T-6178 entranceway to the Building-612 Facility yard area, for use by qualified personnel during initial spill/emergency response actions. Additional SCBA units are available from the LLNL Fire Department response vehicles, including the Special Services Unit 1 hazardous materials emergency truck, and from the LLNL Respirator Services group.

Following evaluation of hazards by the appropriate Hazards Control Department Health and Safety discipline (Industrial Hygienist, Health Physicist or other qualified individual), the use of air-purifying respirators may be authorized during spill/emergency responses. With this authorization, NIOSH-approved, full-face piece, air-

purifying respirators equipped with combination acid gas/organic vapor/high efficiency particulate air (AG/OV/HEPA) filter cartridges are available from supplies kept for normal HWM operations in an access-controlled locker in Building-612, Room 103. Issue-point control for these respirators is maintained by the Area 612 Facility Supervisors. Alternative types of air-purifying respirators selected by the cognizant Health and Safety discipline are available from the LLNL Respirator Services group in Building-324.

These respirators will only be given to personnel who have been properly trained and fitted for respirator use and are listed on the Respirator Approval list posted in the respirator locker at each of the respective facilities. Individuals who have not been trained or fitted for respirator use may not participate in the waste handling operations requiring the use of respirators.

The respirator wearer is required to inspect the respirator before using it to ensure it is in proper working condition. Each stored respirator is inspected on a monthly basis by the respirator custodian for physical integrity and to ensure that the 1-yr shelf life has not been exceeded.

The respirator lockers are stocked on demand. The number of respirators maintained varies in the Hazardous Waste Management Facilities. The inventory is dependent on the number of employees in the facility who are approved to wear respirators. Since staff levels vary over time, the number of respirators maintained also varies. At a minimum, the respirator locker contains 9 MSA full-face air-purifying respirators with AGOV/HEPA cartridges: 3 small, 3 medium, and 3 large. It must be noted that respirators are stocked primarily for planned work that require respiratory protection.

Additional respirators (with a variety of cartridges) can be delivered immediately from the LLNL Respirator Shop if necessary. This shop is responsible for distributing, servicing, and cleaning all respirators used at LLNL. Respirators are worn once and are then discarded to respirator receptacles located at each of the facilities. The used respirators are delivered to the respirator shop by the respirator custodian.

The LLNL *Health and Safety Manual* contains more information on the LLNL policy on respirator use.

7.4.5 Emergency Assembly Point Kit (Self-Help Kit)

Protective and emergency equipment is stored in the Self-Help Kit located at the evacuation assembly point for the Area 612 Facility (see Figure 8-1 in Section 8). This kit is maintained for major emergencies that require the evacuation of Area 612 Facility personnel. It contains first-aid equipment, including a first-aid kit, blankets and stretcher. It also includes the following safety equipment: flashlights, safety glasses, gloves (plastic, leather, and cotton), and hard hats, among other items. This kit is inspected on a monthly basis, and items are replaced when necessary.

7.4.6 Material Safety Data Sheets

Material Safety Data Sheets (MSDSs) list the characteristics and hazards of a chemical. An MSDS can be obtained in three ways at LLNL: (1) from the Hazards Control MSDS Hotline (423-2122), (2) from a chemist in the HWM Technology and Information Section (423-6059, 422-8834), and (3) from the Hazardous Waste Management Division's Requisition Control Office (422-9837). The Hazards Control Department maintains files of MSDS's for chemicals routinely used at LLNL. Copies of these MSDS's are available on request. Supply and Distribution also has MSDSs for all products that they purchase.

7.5 **Emergency Lighting**

See Section 6.2.3 for the types of emergency equipment available in the event of a power outage.

7.6 **Decontamination Equipment**

The Hazardous Waste Management Division maintains equipment that is available to decontaminate areas that were in contact with the released hazardous, radioactive, or mixed materials or wastes. This includes containment booms, mops, brooms, shovels, a steam cleaner, pressure washer, electric floor scrubber, and a mercury vacuum cleaner. The steam cleaner and pressure washer are stored at the Support Services Group equipment yard at Building 419 and are inspected monthly.

The Area 612 Facility maintains a wet/dry vacuum cleaner in the Building 612 Container Storage Unit (Room 100). This vacuum cleaner is inspected on a monthly basis. Also located in this room (in a cabinet) are buckets, squirt bottles, rags, wipes, and cleaning solutions. This cabinet is restocked on a monthly basis, or whenever necessary. Chemical solutions used in decontamination operations are presented in Appendix F.

The LLNL Fire Department also maintains decontamination supplies for personnel and/or equipment decontamination. The Tactical Plan 1607 in *LLNL Fire Department Policies and Procedures*, Volume 1 (LLNL, 1987), contains a discussion of the LLNL Fire Department's decontamination equipment.

8. EVACUATION PLAN

The Evacuation Plan for the Area 612 Facility and for the LLNL main site are established in the event that an emergency requires the evacuation of either the Area 612 Facility or the site.

8.1 **Area 612 Facility Evacuation Plan**

Emergency evacuation notification of the Area 612 Facility personnel is made on the LLNL site-wide emergency paging system, by the Area 612 Facility internal paging system, through verbal instructions from the Supervisor or facility personnel, or by activating the incident alarm. Evacuation procedures for the general facility staff, the

Area 612 Facility Supervisor (or alternate), and the Assembly Point Leader are outlined in the following sections.

8.1.1 General Area 612 Facility Staff

General Area 612 Facility Staff (including Technicians/Technologists) follow these steps in a large-scale emergency (that requires evacuation):

- Remain in the Area 612 Facility until it is safe to leave
- Shut down operating equipment
- Upon hearing the evacuation announcement, leave the building/facility by the closest safe exit and go to the designated assembly point; in general, exit to the west (or upwind) from the nearest door or personnel gate. See Figures 8-1 to 8-3 for evacuation routes from the general Area 612 Facility and Figures 8-4 to 8-11 for evacuation routes for each waste management unit in the Area 612 Facility
- Notify others who do not seem to be aware of the evacuation order
- Wait at the Emergency Assembly Point for instructions from the Emergency Management Center; in the interim, follow the Assembly Point Leaders instructions.

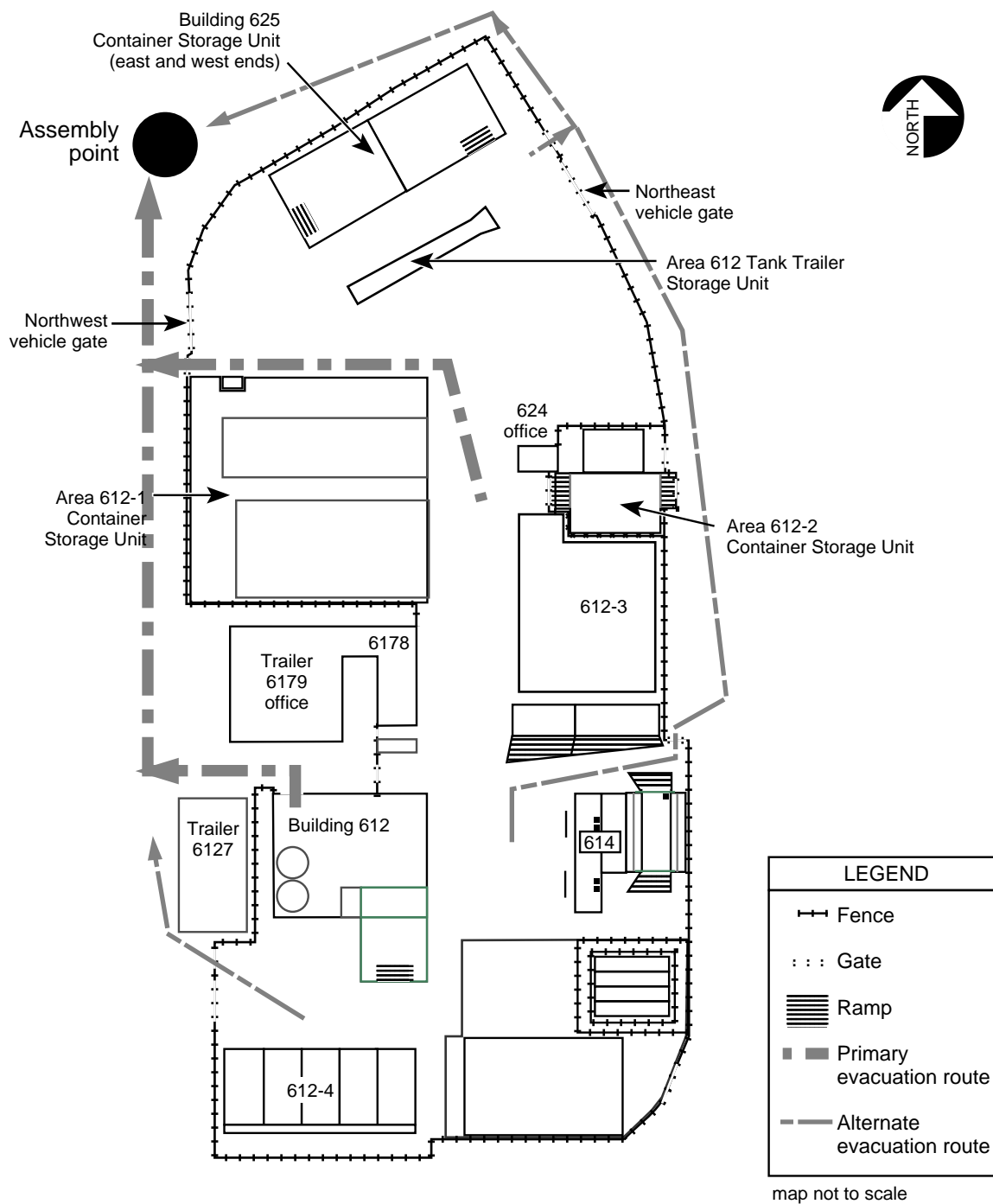


Figure 8-1. Facility Emergency Evacuation Routes for the Area 612 Facility

8.1.2 Area 612 Facility Supervisor or Alternate

The Area 612 Facility Supervisor or alternate follows these steps in a large-scale emergency (that requires evacuation):

- Remain in the Area 612 Facility until it is safe to leave
- Notify personnel of the evacuation order
- Remove the Building/Facility Visitor Log to determine the number of visitors inside the facility; take this book to the emergency assembly point
- Act as Sweep Team Leader; help the Assembly Point Leader organize a sweep team
- Conduct a rapid sweep of the Area 612 Facility to locate unaccounted for personnel who may be injured, provide assistance to any person in trouble, and observe the general condition of the Area 612 Facility
- Ensure that all personnel have left their respective operational areas. Notify individuals who do not seem aware of the evacuation order
- Report Area 612 Facility status to the Hazardous Waste Management Facility Assembly Point Leader using radio communication or a “runner”
- Go to the Emergency Assembly Point, await instructions from the Emergency Management Center; in the interim, follow the Assembly Point Leader’s instructions.

8.1.3 Assembly Point Leader

According to the Self-Help Plan, the Assembly Point Leader follows these steps in a large-scale emergency (that requires evacuation):

- Remain in the Area 612 Facility until it is safe to leave
- Go to the Area 612 Facility designated Emergency Assembly Point
- Establish a command post
- Organize a Sweep Team for the purpose of locating and rescuing trapped, injured, or incapacitated employees within the facility; locating/controlling fires, leaks, and spills; and assessing structural damage to the facility

- Arrange for transportation and first aid for injured employees
- Maintain direct communication with the Sweep Team Leader and Zone Supervisor by radio communication or “runner”
- Communicate the situation assessment to the Emergency Management Center and emergency-response forces (as described in the *LLNL Draft Emergency Plan*).

8.2 Evacuation Routes

Personnel should evacuate through the nearest exit unless the exit is blocked or could place the individual in danger. In general, primary evacuation routes are to the west of the facility. If this is unsafe or otherwise unfeasible, escape should be made through the nearest alternate exit. Since prevailing winds are from the west, western evacuation routes are recommended to stay upwind of any hazardous waste release. Primary and alternate routes for evacuation, along with locations of emergency equipment, from the Area 612 Facility are presented in Figures 7-1 through 7-8. Evacuees are required to report to the assembly point for the Area 612 Facility, which is shown in Figure 8-1.

8.3 LLNL Site-Wide Evacuation Plan

If a major emergency develops that requires the evacuation of personnel from all or part of the LLNL main site, the Protective Force Division will implement actions to control evacuating personnel, protect the on-site emergency scene, and coordinate activities with outside police organizations. The Protective Force Division will initiate one of the operational responses described in the *LLNL Emergency Evacuation Plan*. An event requiring evacuation could be caused by an on-site or off-site emergency such as an earthquake, fire, explosion, or major toxic or radioactive material release. The Laboratory Emergency Duty Officer is authorized to implement area or site-wide evacuation procedures if deemed necessary after receiving a situational assessment from the Incident Officer. Authority and procedures for evacuating a single facility or a small area are not included in this Plan. In either case, the Fire Department controls the on-site emergency, and the Protective Force Division controls personnel.

The *Emergency Evacuation Plan* is a guide for the communications operator and the Protective Force Division’s supervisor, who is responsible for sending personnel to the most affected area of the LLNL main site to direct traffic. This Plan includes several options that need to be taken into consideration. These factors are wind direction, magnitude of the problem, time of day, and day of the week. Coordination with outside law enforcement agencies is also necessary so that traffic exiting LLNL is allowed to flow in an orderly fashion away from the threat and into the outlying community. See the Appendix VIII-E of the Part B permit application for specific evacuation routes from the LLNL site.

9. RECORDKEEPING AND INCIDENT REPORTING

9.1 Internal Reporting

Employees shall notify the Hazardous Waste Management Area 612 Facility Operations Supervisor of all release incidents (large or small), and the Fire Department of all large incident releases (exceeding Level 1), fires, or other emergencies. The Supervisor will gather preliminary information and then must immediately notify upper management, the Hazards Control ES&H Team, and the Environmental Analyst.

The Environmental Analyst evaluates the incident to determine what was released and if the incident is reportable to a State or Federal agency. He or she prepares an internal incident report for all incident levels and submits these to Environmental Protection Department and other LLNL management. A copy of this report is filed by Hazardous Waste Management Division.

An employee who becomes ill or is injured as a result of a job-related accident must notify his supervisor and report to Health Services. Health Services personnel will then collect pertinent information and forward it through the Hazards Control ES&H Team to the employee's department for analysis.

The Environmental Protection Department management, after being informed of a major accident or high-risk incident, must ensure that an incident analysis takes place with the objective of providing information about the nonidentified hazards or less-than-adequate controls that resulted in the incident. Recommendations for corrective measures will be included in the report, and copies shall be distributed to management, Hazards Control, and others who will benefit from information contained in the report. Hazards Control maintains a central file of all incident analysis reports and provides follow-up information. Summary reports are prepared by Hazards Control personnel and are freely distributed within LLNL.

9.2 External Reporting

Releases must be reported to a variety of agencies under different circumstances. In all instances, both verbal and written notification are required.

The Environmental Protection Department (EPD) responds to all reports of releases or other environmental occurrences through a well-established reporting process. EPD has established a 7-days-a-week, 24-hours-a-day, on-call, rotational position called the Environmental Duty Officer (EDO), who can be reached by pager or cellular phone at any time. The EDO determines the reporting requirements, works with environmental analysts and with Laboratory management on the process of notifying federal, state, and local regulatory agencies and DOE, and provides advice on immediate clean-up and monitoring necessary to protect the environment. The EDO responds to occurrences throughout LLNL, in addition to HWM facilities.

9.2.1

Verbal Reports

Whenever the release could threaten human health, safety, or the environment outside the LLNL facility boundaries, verbal notifications are necessary to agencies listed in Table 9-1. A release could threaten health and safety outside the LLNL facility if any of the following conditions is met:

- The release directly results in an injury or illness off-site, that requires medical attention
- The exposure of the public to the released material exceeds the American Conference of Governmental Industrial Hygienist's (ACGIH) allowed threshold limit
- Requires evacuation of the population surrounding LLNL

A release threatens the environment if the following condition is met:

- The released material migrates outside the LLNL facility boundaries and the quantity of the material outside the facility meets or exceeds the reportable quantity (RQ) as defined in the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA).

Table 9-1. Verbal Reports to Agencies for a Release That Threatens Health and Safety Outside LLNL Boundaries

Agency	When	Phone Number
California Office of Emergency Services	Immediately after discovery	(800) 852-7550
Department of Toxic Substances Control, Region 2	Immediately after discovery	(510) 540-3739
National Response Center	Immediately after releasing PCBs greater than 1 lb. Within 24 hours after releases of PCBs greater than 10 lbs.	(800) 424-8802
EPA Region IX	Immediately after discovery	(415) 744-1120
San Francisco Regional Water Control Board	Immediately after discovery	(510) 286-1255 8am to 5pm. OES after normal work hours
Central Valley Regional Water Control Board	Immediately after discovery	(916) 255-3030

Whenever the release could threaten human health, safety, or the environment within LLNL boundaries, verbal notifications are necessary to agencies listed in Table 9-2. Criteria for determining if the health and safety of LLNL employees are threatened are as follows:

- The release directly results in an injury or illness that requires medical attention

- The exposure of personnel to the released material exceeds the ACGIH's allowed threshold limit
- The release requires the evacuation of the Area 612 Facility or other LLNL facilities.

Table 9-2. Verbal Reports to Agencies for a Release That Threatens Health and Safety Within LLNL Boundaries

Agency	When	Phone Number
Department of Toxic Substances Control, Region 2	Immediately after discovery	(510) 540-3739

A release threatens the environment if either of the following conditions is met:

- The quantity of released material at the LLNL facility meets or exceeds the reportable quantity (RQ) as defined in CERCLA
- The Environmental Analyst determines that the release constitutes a potential threat to the environment.

Whenever the Area 612 Facility Contingency Plan is implemented, verbal reports are also necessary to agencies listed in Table 9-2. The Area 612 Facility Contingency Plan must be implemented if any one of the following actions occur:

- The Area 612 Facility is evacuated due to an incident
- The Area 612 Facility personnel request the LLNL Fire Department's assistance in handling an incident and cleaning up the release (e.g., the release is from a large, i.e., Level 2, 3, or 4 incident)
- The incident results in injuries to personnel that require medical attention.

All verbal reports will include the following:

- Name and telephone number of the reporter
- Name and address of the facility
- Time and type of incident (e.g., release or fire)
- Name and quantity of material(s) involved, to the extent known
- Extent of injuries, if any
- Possible hazards to human health or the environment outside the LLNL facility boundaries

- Actions taken and status of facility.

All verbal notification to the U.S. Department of Energy for hazardous and radioactive releases are completed in accordance with DOE Order 5000.3B (Occurrence Reporting).

The Operations and Regulatory Affairs Division Leader (or designee) of LLNL's Environmental Protection Department is responsible for all required verbal notifications to State or Federal agencies.

9.2.2 Written Reports

Agencies listed in Table 9-3 must receive written reports for all releases that could threaten human health and the environment outside the LLNL facility boundaries.

Whenever a hazardous waste release could threaten human health, safety or environment within LLNL, or whenever the Area 612 Facility Contingency Plan is implemented, the Environmental Protection Agency Region IX Administrator and the Department of Toxic Substances Control, Region 2, must be notified in writing. The due date for the report and the agency addresses for these two agencies are the same as shown in Table 9-3. The California Office of Emergency Services need not be notified unless the incident is assessed as representing a threat to human health and the environment outside the LLNL facility boundaries.

Table 9-3. Written Reports to Agencies for a Release That Threatens Human Health and Safety

Agency	Notification Required	Address
Environmental Protection Agency	Within 15 days of the incident	Regional Administrator U.S. EPA Region IX 215 Fremont St. San Francisco, CA 94195
California Office of Emergency Services	Within 5 days of the incident	Office of Emergency Services 2800 Meadow View Road Sacramento, CA 95832
Department of Toxic Substances Control, Region 2	Within 15 days of the incident	California EPA Department of Toxic Substances Control 700 Heinz Avenue Suite 200 Berkeley, CA 94710

All written reports will include the following:

- Name, address, and telephone number of the owner or operator (LLNL)
- Name, address, and telephone number of the Area 612 Facility

- Date, time, and type of incident (e.g., release, fire, or explosion)
- Name and quantity of material(s) involved
- Extent of injuries, if any
- Assessment of actual or potential hazards to human health or the environment, when this is applicable
- Estimated quantity and disposition of recovered material that resulted from the incident
- Notice that incompatible wastes were not being handled until cleanup procedures were completed and that all equipment listed in the contingency plan is cleaned and fit for its intended use.

All written notification to the U.S. Department of Energy for hazardous and radioactive releases are completed in accordance with DOE Order 5000.3A.

The Environmental Operations Group's Environmental Analyst (assigned to the Area 612 Facility) will write the appropriate reports to regulatory agencies for incidents occurring during normal working hours. The Environmental (Protection) Duty Officer (EDO) evaluates, classifies, and writes all necessary reports for incidents occurring during off-work hours. The EDO position is one that rotates among qualified Environmental Analysts within the Environmental Protection Department. Each EDO is on-call 24 hours a day for a one week period (including weekends and holidays).

All written reports will be reviewed and forwarded to the appropriate regulatory agency by the Environmental Protection Department Head.

In addition, emergencies requiring activation of the Emergency Management Center will be subject to the reporting requirements of the *LLNL Draft Emergency Plan*. The Deputy Crisis Manager supervises the investigation of the incident and the preparation of the Investigation Report.

All Hazard Waste Management Division related incident reports (both reportable and recordable) are maintained in the files at the Hazardous Waste Management Facility. These files represent Hazardous Waste Management Facility operating record.

10. REFERENCES

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APPENDIX A

Personal Protective Equipment Guidelines

Appendix A Personal Protective Equipment Guidelines *

Waste Category	Examples of Waste	Gloves	Protective Clothing	Respirator (see note)
Acid Waste	Mineral Acid (sulfuric, hydrochloric, hydrobromic)	Wear poly laminate (Silver Shield [®] or Safety 4-H [®]) and neoprene or nitrile gloves	Full body, chemically resistant, protective coveralls (Chemrel or equivalent) and PVC** boots or polyethylene booties	Full-face air-purifying respirator with AGOV/HEPA cartridges [†]
	Organic Acid	Wear poly laminate (Silver Shield [®] or Safety 4-H [®]) and neoprene or nitrile gloves	Full body, chemically resistant, protective coveralls (Chemrel or equivalent) and PVC boots or polyethylene booties	Full-face air-purifying respirator with AGOV/HEPA cartridges [†]
	Perchloric Acid	Call LLNL Fire Department (ext 911)		
	Hydrofluoric Acid	Call LLNL Fire Department (ext 911)		
	Chromic Acid	Wear poly laminate (Silver Shield [®] or Safety 4-H [®]) and neoprene or nitrile gloves	Full body, chemically resistant, protective coveralls (Chemrel or equivalent) and PVC boots or polyethylene booties	Full-face air-purifying respirator with AGOV/HEPA cartridges [†]
Aqueous Waste	Spent photo chemicals, rinse waters, spent plating solutions, machine coolants	Neoprene	Polyethylene coated full body Tyvek coveralls or full body, chemically resistant, protective coveralls (Chemrel or equivalent) and polyethylene booties	Full-face air-purifying respirator with AGOV/HEPA cartridges [†]
Caustic Waste	Sodium hydroxide, potassium hydroxide, calcium hydroxide	Wear poly laminate (Silver Shield [®] or Safety 4-H [®]) and neoprene or nitrile gloves	Full body, chemically resistant, protective coveralls (Chemrel or equivalent) and PVC boots or polyethylene booties	Full-face air-purifying respirator with AGOV/HEPA cartridges [†]
	Ammonia	Wear poly laminate (Silver Shield [®] or Safety 4-H [®]) and neoprene or nitrile gloves	Full body, chemically resistant, protective coveralls (Chemrel or equivalent) and PVC boots or polyethylene booties	Full-face respirator with ammonia cartridge
Flammable Liquids Waste	Gasoline, acetone, toluene, xylene, ethanol	Wear poly laminate (Silver Shield [®] or Safety 4-H [®]) and neoprene or nitrile gloves	Full body, chemically resistant, protective coveralls (Chemrel or equivalent) and PVC boots or polyethylene booties	Full-face air-purifying respirator with AGOV/HEPA cartridges [†]
PCB Waste	PCB-contaminated oil, transformer fluid, capacitor fluid	Wear poly laminate (Silver Shield [®] or Safety 4-H [®]) and neoprene or nitrile gloves	Full body, chemically resistant, protective coveralls (Chemrel or equivalent) and PVC boots or polyethylene booties	Full-face air-purifying respirator with AGOV/HEPA cartridges [†]
Strong Oxidizers	Chromic acid, nitric acid (above 40%), perchloric acid (above 40%)	Chemical specific selection required. To be determined by Hazards Control		
	Nitrates, perchlorates, chlorine, chlorites, chlorates, peroxides, and permanganates	Chemical specific selection required. To be determined by Hazards Control		
Water Reactives DO NOT USE WATER	Lithium hydride, sodium and potassium metals, uranium turnings, and acetyl chlorides	Call LLNL Fire Department (ext 911)		

* Contact Hazards Control Safety Team to verify adequacy of equipment for specific spill.

** Polyvinyl chloride.

† Acid gases/organic vapors/HEPA (AGOV/HEPA).

NOTE: Respirator use is dependent on quantity, type, and location of material spilled. They are to be used only within limitations of respirator and cartridge. Air purifying respirators will only be issued following an assessment by the appropriate Hazards Control Safety discipline. SCBA respirators may be substituted.

APPENDIX B

Equipment to Contain and Absorb Spills

Appendix B. Equipment to Contain and Absorb Spills *

Waste Category	Type of Equipment	Material	Additional Equipment *
Acid	absorbent socks	Polyethylene pulp	polypropylene shovels polyethylene bags brooms (chemically resistant) dust pan (chemically resistant) caution tape pH paper
	absorbent (loose)	Silicates (Floor Dry: diatomaceous earth or equivalent)	
	acid neutralizer/absorbent	Magnesium oxide, sodium bicarbonate, Neutrasorb, Kolor-Safe acid, or equivalent	
Aqueous	absorbent socks	Polyethylene pulp	polypropylene shovels polyethylene bags brooms (chemically resistant) dust pan (chemically resistant) caution tape
	absorbent (loose)	Silicates (Floor Dry: diatomaceous earth or equivalent)	
Caustic	absorbent socks	Polyethylene pulp	polypropylene shovels polyethylene bags brooms (chemically resistant) dust pan (chemically resistant) caution tape pH paper
	absorbent (loose)	Silicates (Floor Dry: diatomaceous earth or equivalent)	
	caustic neutralizer	Spill-x-c, Neutrakit, Kolor-Safe base, or equivalent	
Flammable Liquids	absorbent socks	Polyethylene pulp	polypropylene shovels polyethylene bags brooms (chemically resistant) dust pan (chemically resistant) caution tape
	absorbent (loose)	Silicates (Floor Dry: diatomaceous earth or equivalent)	
	solvent absorbent	Spill-x-s, Solusorb, or equivalent	
PCB	absorbent socks	Polyethylene pulp	polypropylene shovels polyethylene bags brooms (chemically resistant) dust pan (chemically resistant) caution tape
	absorbent (loose)	Silicates (Floor Dry: diatomaceous earth or equivalent)	
	detergent	Powerclean 151 or equivalent	
Strong Oxidizers	absorbent socks	Polyethylene pulp	polypropylene shovels polyethylene bags brooms (chemically resistant) dust pan (chemically resistant) caution tape pH paper
	absorbent (loose)	Silicates (Floor Dry: diatomaceous earth or equivalent)	

* See Appendix E (Emergency Spill Kit Supplies) for a more complete list.

APPENDIX C

**Waste Absorption and
Neutralization Guidelines**

Appendix C. Waste Absorption and Neutralization Guidelines

Waste Category	Guidelines to Absorb and/or Neutralize
Acid	<p>Contain the spill by surrounding it with absorbent socks or by diking the perimeter with scoops of loose absorbent material compatible with the substance spilled. Begin at the side(s) where flow is most rapid and on side(s) where release flows toward drains or other conduits to the environment. Next, cover the spill with loose, compatible absorbent material, working from the perimeter inward toward the center. Use sufficient quantities to completely cover the liquid. An acid neutralizing absorbent may be substituted, if neutralization is desired. Carefully stir the absorbent-covered spill with a shovel. The mixture will change color when the acid is neutralized.</p> <p>Very small spills may be contained and absorbed solely with an absorbent sock.</p> <p>When the spill is completely soaked up, discard all absorbent material as hazardous waste. Use a shovel to scoop up the loose absorbent. A chemically resistant broom and dust pan may be used to sweep up absorbent residue.</p> <p>Use wetted absorbent towels or pads to clean surface area until it tests neutral with pH paper.</p>
Aqueous	<p>Contain the spill by surrounding it with absorbent socks or by diking the perimeter with scoops of loose absorbent material compatible with the substance spilled. Begin at the side(s) where flow is most rapid and on side(s) where release flows toward drains or other conduits to the environment. Next, cover the spill with loose compatible absorbent material, working from the perimeter inward toward the center. Use sufficient quantities to completely cover the liquid. Carefully stir the absorbent-covered spill with a shovel.</p> <p>Very small spills may be contained and absorbed solely with an absorbent sock.</p> <p>When the spill is completely soaked up, discard all absorbent material as hazardous waste. Use a shovel to scoop up the loose absorbent. A chemically resistant broom and dust pan may be used to sweep up absorbent residue.</p> <p>Use wetted absorbent towels or pads to clean surface.</p>
Caustic	<p>Contain the spill by surrounding it with absorbent socks or by diking the perimeter with scoops of loose absorbent material compatible with the substance spilled. Begin at the side(s) where flow is most rapid and on side(s) where release flows toward drains or other conduits to the environment. Next, cover the spill with loose, compatible absorbent material, working from the perimeter inward toward the center. Use sufficient quantities to completely cover the liquid. A caustic neutralizing absorbent may be substituted, if neutralization is desired. Carefully stir the absorbent-covered spill with a shovel. The mixture will change color when the caustic is neutralized.</p> <p>Very small spills may be contained and absorbed solely with an absorbent sock.</p> <p>When the spill is completely soaked up, discard all absorbent material as hazardous waste. Use a shovel to scoop up the loose absorbent. A chemically resistant broom and dust pan may be used to sweep up absorbent residue.</p> <p>Use wetted absorbent towels or pads to clean surface area until it tests neutral with pH paper.</p>
Flammable Liquid	<p>Contain the spill by surrounding it with absorbent socks or by diking the perimeter with scoops of loose absorbent material compatible with the substance spilled. Begin at the side(s) where flow is most rapid and on side(s) where release flows toward drains or other conduits to the environment. Next, cover the spill with loose compatible absorbent material, working from the perimeter inward toward the center. Use sufficient quantities to completely cover the liquid. Carefully stir the absorbent-covered spill with a shovel.</p> <p>Very small spills may be contained and absorbed solely with an absorbent sock.</p> <p>When the spill is completely soaked up, discard all absorbent material as hazardous waste. Use a shovel to scoop up the loose absorbent. A chemically resistant broom and dust pan may be used to sweep up absorbent residue.</p> <p>Use wetted absorbent towels or pads to clean surface.</p> <p>Seal contaminated clothing and absorbent material in a vapor-tight container.</p>

Waste Absorption and Neutralization Guidelines (Continued)

Waste Category	Guidelines to Absorb and/or Neutralize
PCB	<p>Contain oily spill by surrounding it with absorbent socks. These are easier to clean up than loose absorbent.</p> <p>Next, cover the spill with absorbent socks, working from the perimeter of the spill inward toward the center. (Loose absorbent may be used for this step, if desired. Stir the pile of absorbent carefully.)</p> <p>When the PCB is totally absorbed, carefully place the socks into a disposal bag or directly into an appropriate waste container. Contaminated concrete, asphalt and soils may be removed. (If applicable, shovel loose absorbent into a waste container.)</p> <p>Metal on impervious surfaces must be double washed or rinsed with kerosene, hexane, or an appropriate detergent (an equivalent solvent in which PCBs are at least 5 percent soluble by weight). Keep area cordoned off until swipe samples are collected, analyzed, and approved.</p>
Acid Oxidizer	<p>Contain the spill by surrounding it with absorbent socks or by diking the perimeter with scoops of loose absorbent material compatible with the substance spilled. Begin at the side(s) where flow is most rapid and on side(s) where release flows toward drains or other conduits to the environment.</p> <p>Next, cover the spill with loose, compatible absorbent material, working from the perimeter inward toward the center. Use sufficient quantities to completely cover the liquid. An acid neutralizing absorbent may be substituted, if neutralization is desired. Carefully stir the absorbent-covered spill with a shovel. The mixture will change color when the acid is neutralized.</p> <p>Very small spills may be contained and absorbed solely with an absorbent sock.</p> <p>When the spill is completely soaked up, discard all absorbent material as hazardous waste. Use a shovel to scoop up the loose absorbent. A chemically resistant broom and dust pan may be used to sweep up absorbent residue.</p> <p>Use wetted absorbent towels or pads to clean surface area until it tests neutral with pH paper.</p>
Other Oxidizer	<p>Contain the spill by surrounding it with absorbent socks or by diking the perimeter with scoops of loose absorbent material compatible with the substance spilled. Begin at the side(s) where flow is most rapid and on side(s) where release flows toward drains or other conduits to the environment.</p> <p>Next, cover the spill with loose compatible absorbent material, working from the perimeter inward toward the center. Use sufficient quantities to completely cover the liquid. Carefully stir the absorbent-covered spill with a shovel.</p> <p>Very small spills may be contained and absorbed solely with an absorbent sock.</p> <p>When the spill is completely soaked up, discard all absorbent material as hazardous waste. Use a shovel to scoop up the loose absorbent. A chemically resistant broom and dust pan may be used to sweep up absorbent residue.</p> <p>Use a wetted absorbent pad to clean surface.</p>

APPENDIX D

Emergency Equipment List
and Schedule for Testing

Appendix D. Emergency Equipment List and Schedule for Testing*

Item	Building Location	Physical Description	Capabilities	Inspection Frequency	Responsible Person/ Group
Telephones	See Figures 7-1 through 7-8	Touch tone telephone	Calling supervisor, emergency dispatcher, or other key personnel; and to access paging system throughout the facility	Weekly	Hazardous Waste Management Facility Supervisor
Area 612 Facility Paging System	Area 612 Facility	Activated by dialing “#133” on a touch tone telephone	Audio notification of an emergency to Area 612 Facility personnel; may communicate an evacuation order	Weekly	Hazardous Waste Management Facility Supervisor
LLNL Emergency Public Address System	All buildings and the Area 612 Facility Yard have speakers	This PA System was fabricated for LLNL. Audible from any point at the laboratory	Site-wide or selected area voice information system	Annual	LLNL Plant Engineering
Radio pagers	Worn by all operations personnel who handle hazardous waste at all Hazardous Waste Management Facilities	Small, battery operated, personnel radio pagers worn by Hazardous Waste Management operations personnel	Informing personnel that they should call a certain extension for instructions	Daily (when in use)	Hazardous Waste Management Operations Personnel
Fire Alarms	B612 Room 107	Pull box	Audio alarm for personnel in the area and the emergency dispatcher	Semi-annual	LLNL Plant Engineering Department and/or LLNL Fire Department
Incident Alarm Pull Boxes	See Figures 7-1 through 7-8	Activated at pull box stations	Alarm to notify the emergency dispatcher at the LLNL Fire Department	Semi-annual	LLNL Plant Engineering Department and/or LLNL Fire Department
Smoke Detectors	B612 Room 107	Dual ionization chambers and solid-state electronics	Automatically notifies LLNL emergency dispatcher when smoke is detected.	Semi-annual	LLNL Plant Engineering Department
Eye Wash Station	See Figures 7-1 through 7-8	Two soft-spray outlet heads equipped with float-off dust covers to keep out contaminants	Used to flush irritants and/or toxics from the eyes without causing further injury	Weekly	Hazardous Waste Management Facility Supervisor
Showers	See Figure 7-1 through 7-8	High visibility ABS plastic shower head with IPS stay-open ball valve	Used to wash irritants and/or toxics from skin without causing further injury	Weekly	Hazardous Waste Management Facility Supervisor

*Maintenance performed as necessary based on inspection results.

Emergency Equipment List and Schedule for Testing (Continued)

Item	Building Location	Physical Description	Capabilities	Inspection Frequency	Responsible Person/ Group
Respirators	B612 Room 102 (respirator locker)	At a minimum the respirator locker is stocked with 9 MSA full-face air-purifying respirators with AGOV/HEPA cartridges.** 3 small 3 medium 3 large	Generally maintained for planned work but can also be used in emergency response situations, when appropriate	Daily (when in use) users inspect each respirator prior to use) Monthly (integrity check on stored respirators) Replenished as used	Respirator user Respirator custodian Respirator custodian
Self Contained Breathing Apparatus	T6178 (in locker by Room 1104)	Survivair Mark II Two are available at all times	Provides breathable air to personnel wearing these during an emergency or planned work	Quarterly	LLNL Hazards Control
Emergency Personal Protective Equipment	See Figures 7-1 through 7-8	See Section 7.4.4	Protect personnel from exposure to hazardous constituents. Generally maintained for planned work but can also be used in emergency response situations.	Checked on a Weekly Basis	Hazardous Waste Management Support Services Supervisor
Self-Help Kit	At the Area 612 assembly point (Figure 8-1) Weatherproof box	See Section 7.4.5	Contains first aid and other emergency equipment to be used in the event of an emergency	Monthly	Hazardous Waste Management Support Services Supervisor
Emergency Electric Generator	Portable generators in B419 and in the Spill Response Trailer in B612 yard	Gas powered portable electricity generators (1500 watt/3 HP)	Provides electricity for emergency lighting or equipment	Monthly	Hazardous Waste Management Support Services Supervisor
Emergency Lighting	B612 Room 107	Dual beam battery pack	Provides lighting during power outages or emergency situations.	Monthly	Hazardous Waste Management Support Services Supervisor
Berms and Secondary Containment	Area 612 Facility	Cement, asphalt, and other engineered control structures used to provide containment of wastes during normal operations and emergencies	Physical barriers used to segregate, store, and contain wastes	Weekly	Hazardous Waste Management Facility Supervisor

** Additional respirators (with a variety of cartridges) can be delivered immediately by the LLNL Respirator Shop, if necessary. For Level 2, 3, or 4 incidents, the LLNL Fire Department brings its own supply of respirators.

Emergency Equipment List and Schedule for Testing (Continued)

Item	Building Location	Physical Description	Capabilities	Inspection Frequency	Responsible Person/ Group
Portable Pumps	Area 612 and 514 facility Pump-out truck	Gas and diesel powered trash pumps in various sizes	Used to remove standing water from berms and to pump out tanks and sumps Portable pumps stored in various locations in the Area 612 and 514 facility	Monthly	Hazardous Waste Management Support Services Supervisor
Auxiliary Fire Hose Water Hook-Ups (1.5 in.)	B614 (north side) B624 (north side)	1.5 in. hose connections compatible with standard Fire Department hoses	Normally used for everyday operations but can be used as backup fire hoses, if necessary	Monthly	Hazardous Waste Management Support Services Supervisor
Decon-tamination Equipment	Support Services Group Equipment Yard (located north of B419)	Steam cleaner, pressure washer	Cleaning up residue in areas which came in contact with released hazardous, radioactive, or mixed wastes.	Monthly	Hazardous Waste Management Support Services Supervisor
Spill Response Trailer	Parked north of the Area 612-2 Container Storage Unit	Trailer stocked with bulk emergency spill response equipment	Backup to LLNL Fire Department for large spill mitigation	Weekly	Hazardous Waste Management 612 Facility Supervisor
Portable Two-Way Radios	Maintained at T6179	Hand-held, cordless radio units with a 2 mile range	Mobile two-way radio communications for use during a major emergency	Weekly	Hazardous Waste Management 612 Facility Supervisor
Automatic Sprinkler/ Fire Suppression System	B625 B612	Brand Name: Potter Roemer	Fires can be suppressed by either sprinkler or flooding (CO ₂ or Halon) systems; activation of this system automatically activates an alarm at the emergency dispatch center	Quarterly	LLNL Fire Department
Vehicles, Forklifts, Cranes, Vacuum Sweeper, and Operational Equipment	Area 514 Facility	Operational equipment used in the handling and movement of waste containers. May also be used in emergency situations	Transportation vehicles lifting devices, and other equipment which transports waste	Monthly	Hazardous Waste Management Support Services Supervisor

Emergency Equipment List and Schedule for Testing (Continued)

[illegible]

APPENDIX E

Emergency Spill Kit Supplies for the Building 233 Container Storage Unit

Appendix E. Emergency Spill Kit Supplies for the Area 612 Facility

Unit	Quantity	Item/Specifications	Capabilities	Limitations
Each	3	Chemically resistant protective coveralls (Chemrel or equivalent)	Provides for chemical and abrasion resistance. Resistant to acids (including hydrofluoric), caustics (including sodium hydroxide 50%), organic solvents (including acetone 90%), PCBs, petroleum oils, and many other chemicals. Elastic wrists and ankles provide splash protection.	Disposable coverall designed for limited contact during chemical response activities. Limited breakthrough protection for: ethers (1 min), bromine liquid 99% (3 min), chloroform 99% (4 min), carbon disulfide (5 min), methylene chloride 99% (5 min).
Each	3	Face shields with clear windows (polycarbonate shield)	Chemically resistant face shield for splash protection. Complies with ANSI Z87.1-1989.	Must be worn with safety glasses.
Each	3	Goggles, clear (chemically resistant, polycarbonate lens)	Provides resistance and splash protection against mild acids, caustics, aromatic hydrocarbons, and methylene chloride. Complies with ANSI Z87.1-1989.	Provides limited vapor protection. Does not provide complete face protection; eye protection only.
Pair	8	Gloves, neoprene	Case-hardened latex neoprene provides exceptional protection against abrasions, cuts, punctures, and a wide range of chemicals. Suggested for petrochemicals, degreasers, oils, acids, caustics, alcohols, and solvents.	Limited breakthrough protection for acetone (12 min), chloroform (12 min), methylene chloride (6 min), toluene (14 min), and trichloroethylene (11 min).
Pair	8	Gloves, poly laminate (Silver Shield®, Safety 4-H or equivalent)	Recommended for immediate response situations involving morpholine, vinyl chloride, acetone, ethyl ether, solvents, and caustics. Breakthrough time for most chemicals is >6 hr (except for methylamine and ethylamine).	Provides limited protection when in contact with ethylamine (70%) and methylamine (40%). (Always use with Neoprene gloves)
Pair	6	Booties, plastic clear, impervious (polyethylene, disposable)	May be used for contamination control, to be worn over protective safety boots. Low concentrations of liquids and vapors, PCBs.	Avoid contact with halogenated hydrocarbons and aromatic hydrocarbons.
Each	6	Absorbent socks (polyester sock filled with polyethylene absorbent specifically designed for acids, bases, solvents, and other aggressive chemicals).	Rapidly absorbs concentrated acids, bases, and solvents, as well as the following: hydraulic fluids, oils, PCBs, organic solvents (e.g., acetone), and coolants. Especially designed for nitric acid, caustics, sodium hydroxide, and most acids (including hydrochloric and sulfuric).	Formaldehyde solutions not to exceed 37%. Strong oxidizing agents may degrade product over an extended period of time.

Emergency Spill Kit Supplies for the Area 612 Facility (Continued)

Unit	Quantity	Item/Specifications	Capabilities	Limitations
Bag	2	Absorbent, 25 lb (Floor Dry or calcined chemically inert diatomaceous earth)	For use as an all purpose oil, grease, and water absorbent. Essentially dust free.	Do not use with hydrofluoric acid or hot alkali solutions.
Package	2	Acid neutralizer (magnesium oxide, sodium bicarbonate, Neutrasorb, or Kolor-Safe acid)	Neutralizes many mineral and organic acids including sulfuric, hydrochloric, and nitric.	May be used for hydrofluoric acid up to 48%.
Package	2	Caustic neutralizer (Spill-x-c, Neutrakit, Kolor-Safe base, or equivalent)	For use on many caustics including sodium hydroxide 50% and ammonium hydroxide 29%.	Limited use for 29%–50% concentrations of caustics. Not recommended for acids, solvents.
Each	1	Drum uprighting tool (drum upender, steel construction equipped with 1.5 in. hook)	Tool to provide leverage to lift drums that have been tipped over to move from horizontal to standing position.	No limitations given. (This is a nonsparking tool)
Each	1	Drum repair kit (Lab Safety Supply Series “D” or equivalent)	Fast, temporary repairs for leaking drums. Restrains all common container leaks due to punctures, cracks, or deterioration. Includes items such as hose tape, seals for pinhole punctures, rubber patches, lead wool and epoxy putty for cracks, “T” bolt patches with neoprene pads, plugs, ball plugs, and felt-covered wooden plugs.	Designed for temporary restraint and repairs to drums only. Does not provide long-term repair.
Each	1	Shovel, plastic, short handle (chemically resistant, nonsparking polypropylene)	Provides for cleanup of absorbent and solids. Resists damage from chemicals and corrosion.	Contains no antistatic agent.
Each	1	Broom handle for push broom	To be used with broom head for sweeping absorbents.	Not applicable.
Each	1	Broom head, push (chemically resistant)	Broom has polyethylene head with chemically resistant polypropylene bristles that will not absorb liquids.	Avoid contact with halogenated hydrocarbons and aromatic hydrocarbons.
Each	2	Broom, shop, rattail (chemically resistant)	Broom has polyethylene head with chemically resistant polypropylene bristles that will not absorb liquids.	Avoid contact with halogenated hydrocarbons and aromatic hydrocarbons.
Each	2	Dust pan (chemically resistant, polyethylene)	To be used in conjunction with brooms for cleanup of absorbent or solids.	Avoid contact with halogenated hydrocarbons and aromatic hydrocarbons.

Emergency Spill Kit Supplies for the Area 612 Facility (Continued)

Unit	Quantity	Item/Specifications	Capabilities	Limitations
E	1	Ratchet, 1/2-in. drive with 15/16-in. socket	Used to remove bolts from rings on ring-top drum.	Must be used with standard drum-ring bolts.
Each	1	Wrench, bung, non-sparking	Used for tightening and loosening drum fittings.	Must be used on standard drum plugs and fittings.
Roll	1	Tape, caution: "Caution Do Not Enter" (heavy-duty, polyethylene)	Alerts workers and bystanders of hazardous areas or dangerous conditions.	Not applicable.
Each	6	Bag, poly, 3 ft by 5 ft (heavy-duty 6 mil polyethylene bags)	To contain and dispose of used absorbent materials associated with spill cleanup.	Avoid contact with halogenated hydrocarbons and aromatic hydrocarbons.
Each	1	Marker, paint tip, black	All purpose labeling pen, writes on plastic, glass, ceramic, metal, rubber, leather, film, and wax paper. Permanent, fade proof, smudge proof.	Not applicable.
Pack	1	Paper, pH (general purpose 0–13)	Provides quick and accurate determination of acids and bases in the field. Range 0–13.	Recommended for pH determinations between 0–13. Accuracy ± 0.5 pH unit.
Box	2	Wipes (Kaydry or equivalent)	Soft cellulose fibers absorb water, solvents, and oils.	Combustible.
Each	1	Flashlights with batteries	Provides emergency lighting in areas of low visibility.	Batteries are checked and replaced as needed on a quarterly basis.
Roll	1	2 in. tape (duct or vinyl)	Seals protective clothing.	Not applicable.

APPENDIX F

Decontamination Agents

Appendix F. Decontamination Agents

Contaminant	Localized Area	Widespread Area
Radioactive materials	<ol style="list-style-type: none"> 1. Brush and detergent* 2. Mild acid solution[†] 3. Top layer removal[†] 	<ol style="list-style-type: none"> 1. High-pressure steam and water 2. Mild acid solution[†] 3. Top layer removal[†]
Metals	<ol style="list-style-type: none"> 1. Brush and detergent* 2. Chelating agent (EDTA disodium salt) 3. Top layer removal 	<ol style="list-style-type: none"> 1. High-pressure steam and water 2. Chelating agent (EDTA disodium salt)[†] 3. Top layer removal[†]
Oil and grease	<ol style="list-style-type: none"> 1. Brush and detergent* 2. High-pressure steam and water[†] 3. High-pressure steam with trisodium phosphate[†] 	<ol style="list-style-type: none"> 1. High-pressure steam and water 2. High-pressure steam with trisodium phosphate[†] 3. Top layer removal[†]
Solvents and organic compounds	<ol style="list-style-type: none"> 1. Brush and detergent* 	<ol style="list-style-type: none"> 1. High-pressure steam and water 2. High-pressure steam with trisodium phosphate[†]
PCBs	<p>Decontamination of impervious surfaces (e.g., metal) using appropriate solvent in accordance with 40 CFR 761.79</p> <ol style="list-style-type: none"> a. Any PCB container to be decontaminated shall be decontaminated by flushing the internal surfaces of the container three times with a solvent. The solubility of PCBs in the solvent must be five percent or more by weight. Each rinse shall use a volume of the normal equal to approximately ten (10) percent of the PCB container capacity. The solvent may be reused for decontamination until it contains 5 ppm PCB. The solvent shall then be disposed of as a PCB in accordance with provisions of 761.60(a) 4 and CCR, Title 22. b. Moveable equipment used in storage areas shall be decontaminated by swabbing surfaces that have contacted PCBs with a solvent meeting the criteria of paragraph (a) of this section. <p>Note: Precautionary measures should be taken to ensure that the solvent meets safety and health standards as required by applicable Federal regulations.</p>	<ol style="list-style-type: none"> 1. High-pressure steam or water 2. High-pressure steam with trisodium phosphate[†] 3. Remove soil, asphalt, and top layer of cement[†]

* Detergent to be used must contain trisodium phosphate.

[†] Only to be used if first procedural step fails to remove contamination.

References:

Unterberg, W., R. W. Melvoid, *et al.* (1989), *Reference Manual of Countermeasures for Hazardous Substance Release*, Hemisphere Publishing.

Esposito, M. P., *et al.* (1987), *Decontamination Techniques for Buildings, Structures and Equipment*, Noyes Data.

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